2005 NPHQ National Achievement Award

Route 18 Extension

The Missing Link...

Preserving the Past, and Sustaining the Future

NJ
HE
356
N5
R6
2005
C.1

Prepared by:

New Jersey
Department of Transportation

State of New Jersey

DEPARTMENT OF TRANSPORTATION
1035 Parkway Avenue
PO Box 600
Trenton, New Jersey 08625-0600

Richard J. Codey
Acting Governor

John F. Lettiere
Commissioner

Mr. Bob Templeton, Executive Director
National Partnership for Highway Quality
12009 West Highway 290
Suite 4
Austin, Texas 78737

Dear Mr. Templeton,

Attached is the New Jersey Department of Transportation's nomination package for the 2005 National Achievement Award.

We have selected our Route 18 Extension project, designed by Gannett Fleming Inc., located in Piscataway Township, New Jersey as the project that best exemplifies outstanding achievement in support of the principles of highway quality.

This project was a culmination of partnership between local and County officials, major corporate businesses, residents, local Historic Societies, and Rutgers University; Context Sensitive Solutions, construction of a long term need for the continuation of Route 18 through Piscataway that has been designed and built in a quality manner and is on schedule and within budget.

The Department appreciates NPHQ committee's consideration for recognition. We are committed to Quality and embrace the opportunity to share our success with the Highway Partnership.

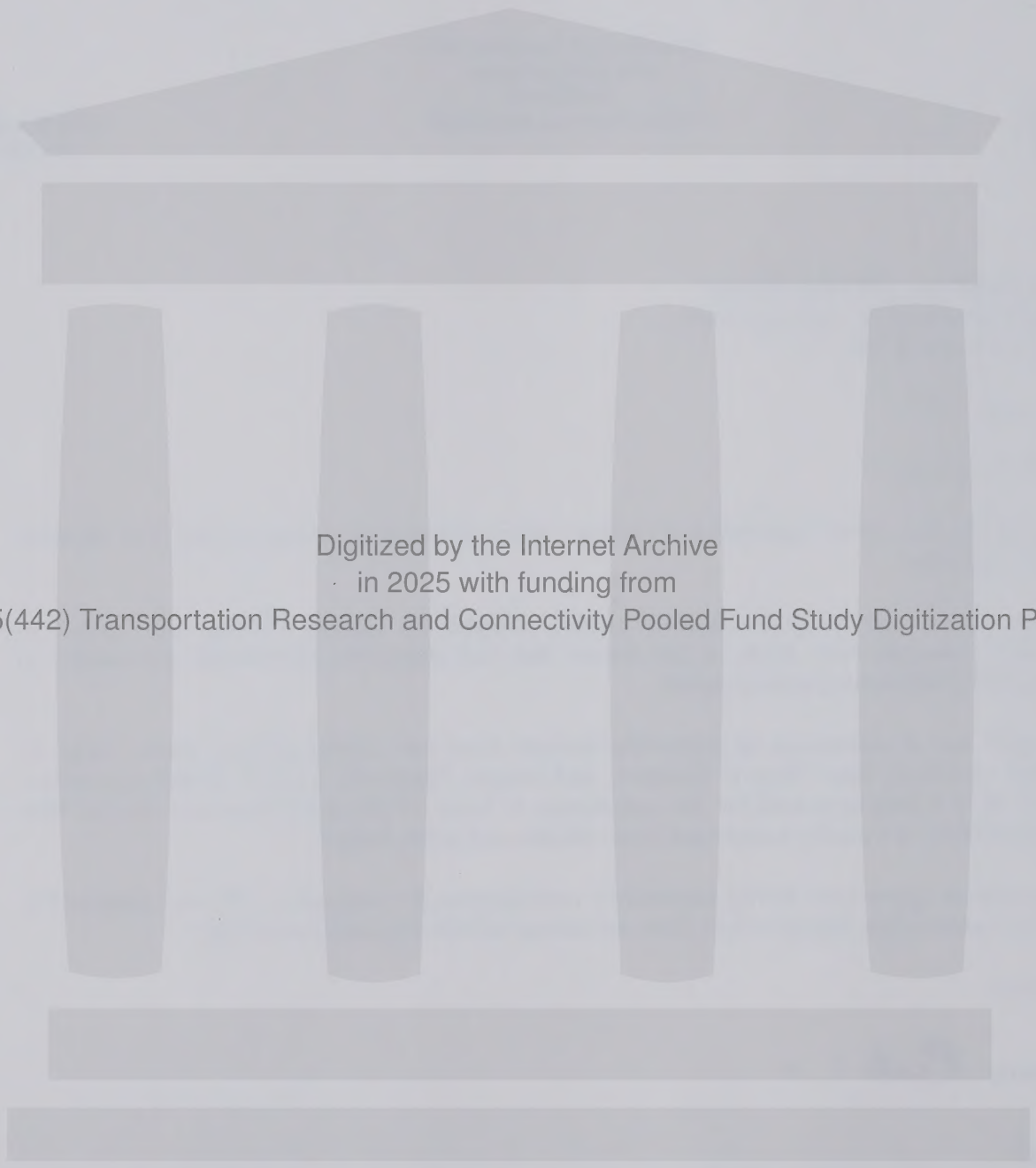
Respectfully,

Lynn Rich

Lynn Rich
Director, Quality Management Services
NJDOT

NJDOT RESEARCH LIBRARY

NJ
HE
356
N5
RG
2005
c.1



Digitized by the Internet Archive
in 2025 with funding from
TPF-5(442) Transportation Research and Connectivity Pooled Fund Study Digitization Project

https://archive.org/details/route-18-extension

NOMINATION FORM

2005 NPHQ
Achievement Award

Entity Nominating Project: The New Jersey Department of Transportation

Project Location Description: Piscataway and Wall Townships, Middlesex County, New Jersey

Project Name*: Route 18 Extension – The Missing Link...Preserving the Past, and Sustaining the Future

*This name will be used in promotional materials for the award.

Team Members:

Owner: The New Jersey Department of Transportation

Construction Manager (if other than owner):

Contractor: Slattery Skanska Inc.

Designer: Gannett Fleming, Inc.

Subcontractors: Use an attachment if needed to complete the list — Please See Attached

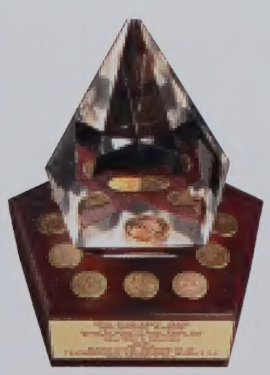
Significant Material Suppliers: Use an attachment if needed to complete the list — Please See Attached

Project Start Date: July 1, 2002

Substantial completion Date (must be no later than December 31, 2004): September 10, 2004

Brief Project Description:

The Route 18 Extension, Section 2A, eliminated a severe transportation bottleneck and completed the "missing link" in the New Jersey State highway system in Piscataway Township. The first step in making this 2.1-mile-long extension a reality was completing the $5.8 million data recovery of the Raritan Landing Archaeological District, which lies beneath the roadway. By building consensus among the local public, balancing competing resources, and implementing numerous innovative solutions, the project team delivered a solution that improves traffic operations and motorist and pedestrian safety, while minimizing community disruption and impacts to environmental, socioeconomic, and cultural resources.



Mail completed nomination form, along with narrative and appendices to:

NPHQ Achievement Award
c/o Bob Templeton
11907 W. Highway 290
Austin, Texas 78737

Nominations must be received by May 9, 2005.

This form is for use in nominating highway projects
for the 2005 NPHQ National Achievement Award.

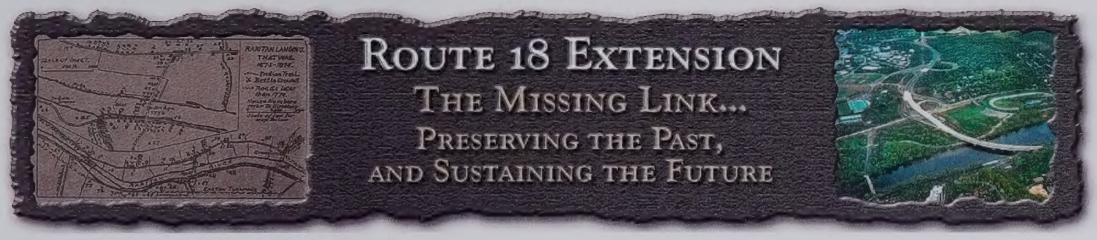
2005 NPHQ Achievement Award
Attachment

Subcontractors:

Aspen Landscaping
Case Foundation
Empire State
Hayward Baker
HC Contractors
Highway Safety
Fletcher Creamer
Intercounty Paving
Manda Corp
Mazzocchi Wrecking Corp
Odaco Services
Power Concrete
Ratto
Schilke Construction
Structural Services
Syrstone
Traffic Lines
US Rebar

Significant Material Suppliers:

Ameristeel
Clayton Concrete
Fitzgerald Formliners
Reinforced Earth Co.
Stravola
Tilcon
Williams Bridge
Ulma Forms



PROJECT OVERVIEW

While Route 18 terminated at the Raritan River for more than 30 years, it was not until 2004 that this much-needed transportation solution, which eliminated a severe congestion bottleneck and completed the "missing link" in the New Jersey State highway system in Piscataway Township, Middlesex County, N.J., became a reality.

The Route 18 Extension project is a 2.1-mile-long highway segment with three interchanges, providing the connectivity to Interstate 287 and access to Rutgers, The State University, and the Piscataway Township Business Center. Portions of the existing road network began as an important overland transportation route in the 1700s. Underlying this location is the 18th century port community of Raritan Landing, a thriving center for local trade in its heyday. The Raritan Landing Archaeological District encompasses this archaeological and cultural resource. In addition to these resources, sensitive environmental areas and parklands were within the project limits.

As such, achieving compatibility between the transportation and environmental requirements, and community values, was vital to the Department in meeting the project's quality objectives. The Department was further entrusted to provide the transportation improvements in an accelerated timeframe. Subsequently, the apparent opportunities of recovering valuable archaeological resources, as well as the apparent risks to the project schedule, were addressed by assembling a highly qualified team to perform data recovery. This team of archaeological consultants and the general contractor successfully coordinated and managed large-scale excavations throughout the project limits. In fact, the $5.8 million data recovery constituted the largest single archaeological data recovery undertaking sponsored by the New Jersey Department of Transportation (NJDOT). To facilitate this effort, state-of-the-art information technology, geographical information systems, and spatial analysis applications were utilized to prioritize and manage data recovery, provide real-time results to the analyst and design teams, and provide a Web-based historic resource to the general public. The objectives were met successfully in unprecedented time – in a five month schedule!

Few projects are as multi-faceted as was the Route 18 Extension. Not only did this project involve competing resources – archaeological/historical, environmental, and socioeconomic – but competing stakeholder views also needed to be heard and concerns addressed. By utilizing an extensive communication network, and engaging the stakeholders in every aspect of this project, the project team was able to build favorable consensus that the design balanced the competing resources and views, and favorable support for the project.

In addition to now providing a continuous four-lane, grade-separated highway to Route 287, the "missing link" also brought about improvements in traffic operations and motorist and pedestrian safety, while minimizing community disruption and impacts to environmental, socioeconomic, and cultural resources. Two miles of multi-use path connects with the county and the university bikeway network. An emergency phone system was installed and tied into the University Safety Office. Historic interpretive signing, architectural enhancements, and landscape treatments were incorporated into the project to relate the heritage of Raritan Landing and its 18th, 19th, and 20th century past. In addition, these aspects sustain the Route 18 Extension transportation improvement into the future.

THE NJDOT COMMITMENT TO QUALITY AND THE MISSION TO "IMPROVE LIFE BY IMPROVING TRANSPORTATION" NURTURED AND PROMOTED THE SUCCESS OF THIS PROJECT.

QUALITY PROCESS AND RESULTS

THE NEW JERSEY DEPARTMENT OF TRANSPORTATION QUALITY MANAGEMENT SYSTEM (NJDOT QMS) was developed and implemented in 1994. The system encompasses all Department activities with a focus on project delivery and system maintenance. The QMS includes continuous quality improvement through a cycle of problem identification, corrective actions, and baseline operational

changes. The Quality System sets the framework to monitor and oversee the project delivery process from planning through design to construction.

The Department's Bureau of Quality Management Services was established to provide quality oversight and monitor the quality control/quality assurance (QC/QA) programs. Periodically it reviews project-specific QA plans and conducts QA audits, including frequent job site visits to verify that QC/QA activities are being performed in accordance with the approved quality assurance plans.

THE DESIGN CONSULTANT QUALITY ASSURANCE PROGRAM PLAN (CQAP) was a requirement established by the NJDOT with formal guidelines issued on July 1, 1997. This document advised the consulting engineering community that every firm wanting to do business with the NJDOT must submit its firm's Quality Assurance Program Plan (following the guidelines established in the CQAP) for review and approval. Gannett Fleming's NJDOT CQAP, and its Corporate Guidelines for Project Management and Quality, require that every project have a project-specific QC/QA plan, the Project Execution Plan (PEP).

The Route 18 Extension PEP was developed and distributed to all team members, including employees and subconsultants. The PEP builds upon the overall Office Quality Procedures Manual, as well as department-specific quality procedures, for the specific project. For example, the Quality Procedures Manual for the Civil/Highway Department includes such elements as Technical Procedures relating to Computations, Design Development, Reports, and Specifications; and Administrative Procedures relating to items such as Correspondence Filing and Field Survey Equipment. The PEP addresses issues related to scope of work, budget, schedule, risk assessments, independent QA reviews, constructibility workshops, and project deliverables. Additionally, Gannett Fleming requires all subconsultants provide confirmation of their NJDOT-approved Quality Procedures Manual, and that they follow the PEP developed by Gannett Fleming.

In order to guarantee compliance to the QC/QA requirements that NJDOT established for consultants, QA reviews are performed by the appropriate Department's units at the consultant's office. These reviews are required prior to initial design and final design submissions. Checklists prepared by NJDOT for disciplines such as geometric design, survey services, traffic signal and safety engineering, and construction, to name a few, are utilized for reporting by the reviewers. The checklists are intended to focus, rather than limit, the scope of the review. Once the review is complete, a memorandum is prepared for the Design Coordination Unit stating a QA review has been conducted and notes the findings. The Design Coordination Unit compiles all memorandums and forwards the package to the NJDOT project manager so that appropriate actions can be taken. The overall goal of the QA review is to assure a quality product progresses to quality construction, and to determine whether the design engineer is taking the necessary measures to ensure a quality submission.

VALUE ENGINEERING ANALYSIS is performed by QMS through workshops on all major contracts. During preliminary design, the Route 18 Extension project was value engineered in an independent workshop. Recommendations ranging from reducing bridge spans, lowering profiles, and reconfiguration of ramps were made. Interestingly, certain recommendations (i.e., reducing bridge spans) for construction cost savings were not implemented due to the determintion that the value of minimizing environmental resource impacts at additional construction cost was in fact more prudent and was a valuable investment.

THE CONTRACTOR'S CONSTRUCTION QUALITY CONTROL AND ASSURANCE is monitored by QMS by using the contract documents, plans, and specifications prepared by the design engineer. The Route 18 Extension contract plans are the largest single contract set of plans in NJDOT history, with 1,668 plan sheets. The supplemental specifications, which amend the NJDOT standard specifications, are prepared for nonstandard items. This contract had 355 nonstandard items out of 1,167 total items. The specifications set the allowable material and construction tolerances. In conjunction with the plans and specifications, inspection guidelines are detailed in the NJDOT's Construction Procedures Handbook. There is also a Construction Manual that contains guidelines for checking and inspecting various elements associated with highway construction. This manual, originally written in 1987, has been updated over the

years to improve on its initial success. NJDOT maintains a Daily Activity Report (DC-29) to track each item of work performed by the contractor in a single day. Any QC/QA issues would be noted on this form.

The contractor, Slattery Skanska Inc., is ISO 9001 certified. Each project begins with an in-house QC/QA program template that gets reviewed and modified to accommodate project-specific concerns before the actual work begins. This program includes what is expected from its subcontractors and suppliers, such as material testing. NJDOT established a laboratory on the Route 18 Project site for testing materials and compaction of soils and aggregates. The Materials Unit of NJDOT utilizes its own quality procedure manual by which to monitor and track the materials being tested for use on the project to ensure QC/QA.

When Slattery developed its quality program for this project, it included reviewing the NJDOT's test results as an additional measure to ensure product quality. Slattery's QA program on this project also involved independent testing of items such as concrete compressive strengths, nuclear density measurements of asphalt, soils, and soil aggregate materials, to name a few.

In contracting with the NJDOT, contractors agree to a stringent monitoring program executed by the state. As an example, Slattery was required to provide various test results to NJDOT. For instance, drilled shafts, static axial, and lateral load tests for verifying load carrying capacity and cross-hole sonic logging tests for determining concrete integrity were performed for a demonstration drilled shaft. Cross-hole sonic logging tests were also performed for all production drilled shafts. Test results were then submitted to Gannett Fleming as well as the NJDOT's Geotechnical Unit for approval.

As a result of the monitoring programs developed and enforced by the state, Slattery received bonuses for either meeting or exceeding the criteria under the regulations of the monitoring programs. There were a few material samples that originally failed, but Slattery was permitted to rectify the item by bringing it up to specification requirements.

NJDOT utilizes a Confidential Contractor's Rating Report (DC-83) to grade the performance of contractors at the completion of a project. This is a rating scale tool used to evaluate the contractor based on management performance, construction supervision, workmanship, training, equal employment opportunity, and document control. The scale levels are one, three, five, and nine, with one being the lowest, and nine being the highest. Slattery's evaluation will be performed when the project is entirely complete.

Slattery shared the responsibility with NJDOT and Gannett Fleming for meeting quality standards. Regular project meetings were held, and quality control issues were always a main focus. The field team discussed on-site testing of materials and upcoming work items so that the construction manager could ensure that any testing of materials for approval by the NJDOT was performed, and that the results showed the materials were acceptable for use on the job.

This project included the use of some unique materials, such as high performance concrete (HPC). Coordination of the various suppliers and the NJDOT Materials Unit representative was required early on in the project. Special testing was required for the development of approved mix designs for the HPC.

Slattery's tool box for measuring quality of its subcontractors and suppliers includes tracking. Subcontractors were required to submit material testing reports during fabrication of materials, such as the precast wall panels. The test results were then recorded in a detailed spreadsheet. Attendance at on-site meetings was required of the major subcontractors. During these progress/planning meetings, a Primavera Project Schedule was utilized as the main tool to chart progress. These schedules were updated regularly based on the outcome of the meetings.

QUALITY RESULTS CAN BE OBJECTIVELY MEASURED on a highway construction project by several key elements, specifically budget and schedule compliance, construction change orders and/or

claims, safety records, traffic operations during construction, adherence to environmental commitments, aesthetics, and public acceptance. The Route 18 Extension Project has performed exceptionally well in each of these areas, as described below.

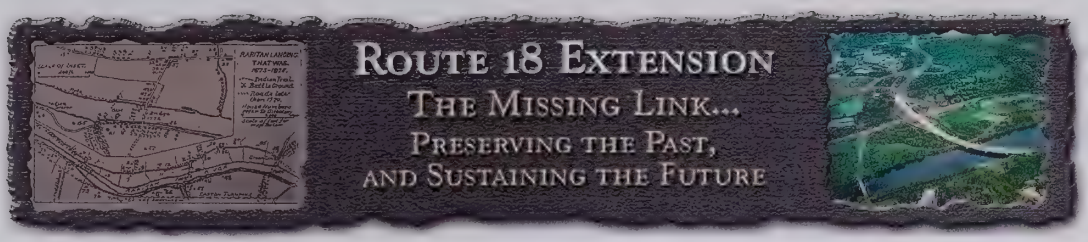
- The outcome of the quality processes performed by the design consultant, and quality audits by the state during the design stages, resulted in no construction claims. Change orders resulted only from unforseen conditions, quantity adjustments, or stakeholder request. There were no error or ommission claims. Change orders did include removal of unforseen debris and unsuitable materials under existing River Road, which was reconstructed in this contract; changes of sidewalk placement, landscape wall, and plantings on Campus Road, requested by Rutgers University to accommodate its master plan revisions; weather delay from a substantial rainy season and extended winter seasons during 2002, 2003, and 2004. This resulted in NJDOT granting an accumulated total nine-month extension of time to allow completion of final landscape planting, final paving surface on local street reconstruction, and architectural bridge painting. Most contract changes were resolved on-site between the resident engineer, design engineer field liaison, and construction manager, without the need for additional paperwork.
- When the construction schedule was created, the number of months in which construction would be halted due to de-forestation, fish spawning, archaeological monitoring, and Rutgers University events were accounted for, leaving no surprises at construction time. Also, relocation of many utility facilities in advance of the construction contract and advance building demolition played an integral part in maintaining the schedule. These items contributed to the entire highway being opened to traffic one month prior to the scheduled substantial completion date, which minimized the impact of a nine-month weather delay time extension to the traveling public. The contract dictated that substantial completion be reached by September 10, 2004.
- The project construction cost was estimated by the engineer at $75,610,180; Slattery's bid was $75,602,733. At the time of this writing, the final dollar amount appears to be $82,041,127---------- $4.17 million for the extension of time due to an accumulated nine months of weather delays, and less than 3 percent cost for change orders due to unforseen conditions or quantity adjustments. This is well below the NJDOT average on projects.
- The Stage Construction Plan maintained traffic flow throughout construction. The Rutgers University Bus System operated on schedule with minimal interuptions, even with detours. Slattery received a NJDOT Certificate of Achievement for outstanding contributions to work zone safety on April 1, 2004. The award is in recognition of its commitment to traffic control and safety, and an exemplarary record of performance.
- There were a number of construction restrictions related to environmental permitting and commitments. These included having to stop working adjacent to Metlar's Brook from April 1 through June 30 due to fish spawns, and from July 1 to September 21 due to clearing restrictions in the Rutgers Preserve because of deer breeding; archaeological monitoring within the archaeological site (Old Raritan Landing), with the potential of a 30-day shutdown if findings were discovered; and working within the flood plain and wetlands of the Raritan River Basin. The environmental commitments were met with the coordination of all involved, and everything was accomplished without citations, fines, or shutdowns.
- The Raritan Landing Historic District Archaeological Data Recovery (the largest recovery project in NJDOT history) was advanced during final design and expedited to meet the accelerated construction advertisement schedule. Thus, it met the commitments to the historic community and regulators.

- During the design process, workshops were held with stakeholders to develop the architectural treatments project-wide. Mock-ups were constructed during final design for consensus building and made available during the bid phase. The contract specifications required the contractor to construct final mock-ups for viewing and comment prior to production. This included formliner pattern and reveal for all concrete surfaces, including bridge piers, abutments, parapets, and walls; concrete staining to mimick stone and contrasted structural elements; steel painting; fence types; planting materials; and paving stones. The project aesthetic was endorsed by all stakeholders and complemented the historic and ecological environment.
- Meeting the customers' needs and concerns during construction was achieved beginning with the community outreach during design and carried forward with the Construction Communication Plan. The stakeholders were integrated within the design process and continued their involvement during construction. For example, Slattery was able to maintain access to residences and businesses at all times through the construction area, including work in the front and backyards of 35 private homes, as well as many Rutgers University educational facilities. Rutgers events that were planned were included in the specifications, however, based on the length of the contract, not all University events were identified. Hence, Slattery cooperated with Rutgers to move operations and equipment during graduation commencements, football games, and other special events. Timely notification of planned activities was key to cooperation.
- Community and stakeholder feedbck via e-mail, letters, and news articles demonstrates a high level of acceptance and gratitude for the project. The involvement of the customers throughout the process, and the commmitment of the NJDOT team to producing a quality product, ensured the success.

THE RESULTS ABOVE OBJECTIVELY ESTABLISH THE PROJECT ACHIEVED A HIGH LEVEL OF QUALITY AND CUSTOMER SATISFACTION.

MANAGEMENT ACTIVELY PROMOTED quality by taking a hands-on approach of oversight and risk management of the Route 18 Extension project, thereby setting the example which it could expect from its subordinates. During the design process, NJDOT upper management was directly involved with resolving barriers that jeopardized the delivery of a quality product. Biweekly meetings were held to monitor the critical path elements and provide the leadership in making decisions to move forward the environmental, right-of-way, and utility and design processes, which typically stall or impact project delivery. The stakeholder concerns were reviewed and addressed. An example is the NJDOT/Rutgers University Cost Sharing Agreement, which was developed to transfer properties needed for right-of-way in exchange for construction enhancements associated with Route 18 at the campus entrances. Management quickly resolved or provided guidance to streamline and ensure the setting and meeting of requirements. The term "quality" is defined as meeting the requirements. The ideas it promotes is recognized by the state as a critical element for doing business. It is aware of the obligation it has to its customers -- residents of the state, as well as everyone who uses the transportation system.

The NJDOT mission statement is "Improving Lives by Improving Transportation" – this extends beyond paving highways to the communities and the environment in which its employees live. The mission is only accomplished by the NJDOT holding steadfast to its conviction of having every entity doing business internally and externally within their realm adhering to the QC/QA policies and procedures it has developed.



The Construction Communication Plan included a team charter with a commitment to quality and communication that was signed by each management team member from the NJDOT, Gannett Fleming, Slattery, the construction manager, and the key stakeholder management, including Rutgers University, Piscataway Township, Middlesex County, and Keep Middlesex Moving (KMM), the transportation management association.

SCHEDULE MANAGEMENT was performed from design through construction. As a condition of the contract during design, Gannett Fleming submitted and maintained a Critical Path Method (CPM) schedule, which was reviewed and monitored by the NJDOT. The schedule activities are based on the NJDOT pipelines and activity IDs in its procedure manual approved by the Federal Highway Administration. As a contract deliverable, the designer submits a baseline construction (CPM) schedule used to establish and monitor the contractor.

Upon award of contract, Slattery was required to submit a baseline Critical Path Method (CPM) schedule that was reviewed and approved prior to construction. Thereafter, Slattery provided updates every three months. Updates were provided more frequently when the weather delays began to accumulate. Slattery faced many weather obstacles during construction, ultimately being granted a nine-month extension of time that was substantiated by the CPM schedule. Slattery worked on a very aggressive schedule to minimize the impact of the delay on the motoring public and completed the highway and interchanges one month prior to the scheduled substantial completion date.

An incentive for early completion was not offered for this project due to the environmental and university traffic impact concerns. However, liquidated damages were included in the contract and would have been incurred should the project not have finished on time. None were applied. There were penalties specified in the contract for unsatisfactory workmanship, as well as bonuses for exceeding requirements. Most concrete testing is subject to penalties for low strength, but there are a few concrete items subject to bonuses for exceeding the required strengths. Some of these items, which contribute to rideability, include precast concrete piles, concrete deck, and parapets. For example, bituminous concrete is placed using a string line to ensure correct thickness, and cores are taken of the asphalt to test for air voids and thickness – both of these examples are subject to penalties or bonuses. It is the state's policy to wait until the project is entirely complete before it performs analyses on these items to calculate penalties and/or bonuses.

WORK ZONE SAFETY is of the utmost importance. Slattery established an OSHA Strategic Partnership Agreement with the Local Union Trade Councils, which was supported by NJDOT and the NJ On-Site Consultation Service. A dedicated safety officer was assigned to this project. Safety meetings were held weekly to discuss work zone safety, work activities planned for that week, and the current weather conditions (excessive heat, cold, etc.) that might have an impact on the work scheduled. Attendance sheets were maintained for these important meetings. Also, a complete material safety data sheet file was maintained on site, and included information on all dangerous materials delivered to the site. Additionally, unscheduled job-site safety inspections were conducted by representatives of Slattery's main office and accompanied by a representative of its insurance company to confirm that compliance to safety regulations was being met. NJDOT performed safety evaluations on a regular basis, which resulted in Slattery receiving the NJDOT Certificate of Achievement for outstanding contribution to Work Zone Safety on April 1, 2004.

CUSTOMER FOCUS

The Route 18 Extension was envisioned in the 1960s, but delayed for multiple reasons -- funding, alternative alignments, and public concern. NJDOT recognized that the community concerns would have to be addressed and public support cultivated. To gain full support for this project before, during, and after construction, NJDOT realized it must meet the needs and address the concerns of the communities impacted by the project. The communities extended from the local community, Rutgers University

population, and the historic community. To succeed, effective interaction and continuous communication with the community was vital.

During the environmental assessment, the preferred alternative was set with close interaction with stakeholders. It became evident that the Raritan Landing Historic Archaeological District and remaining historical structures were of the highest concern. Partnering with the SHPO, New Jersey Department of Environmental Protection (NJDEP), and the FHWA Advisory Council became key in arriving at the solution of a data recovery approach and the balancing of environmental resources. Ultimately, the process led to a NEPA Finding of No Significant Impact, and the project moved to final design.

The community involvement continued through final design with workshop and public information centers. The workshops focused on traffic impacts, access, and circulation, multi-modal enhancements, view sheds, environmental permitting, and architectural treatments, including fence types, concrete formliners with cut stone, staining, and painting. Consensus was made and recommendations were incorporated into the project, including 1.9 miles of multi-use paths with historic interpretive signing. Final roadway sections were designed to accommodate reverseable temporary lanes for university events at Rutgers Stadium.

The Route 18 Extension, which divides two main campuses of Rutgers University, Bush and Livingston, also serves as the transportation backbone of the University, linking the Piscataway campuses with the three campuses in the city of New Brunswick across the Raritan River. It provides the conduit for bussing 45,000 students per day, plus commuters, faculty, and staff. Extensive coordination resulted in developing temporary bus stops, detours, and temporary bus-only access roads. With close coordination with the University, traffic impacts were minimized during the three-year construction period.

It was recognized that an extensive communication plan would be required during construction to maintain the stakeholder and public involvement with the progression of construction. Reactive and proactive communication plans were implemented. Communication resources and network responsibilities were assigned to the Township, County, TMA, Rutgers, and NJDOT. Construction look aheads were sent out to the stakeholders and they, in turn, communicated with their constituents. The Township televised information on its local cable channel, local newsletter, and reverse 911 number; Rutgers used its Web site, INFO Radio, RUTV, and RU e-mail; Keep Middlesex Moving used its Web site and fax network.

ENVIRONMENTAL STEWARDSHIP is essential for a quality project. Significant strides were made to adopt avoidance alternatives or apply minimization techniques to mitigate impacts. The Historic and Cultural Societies were very concerned with the data recovery of Raritan Landing, which was advanced ahead of construction. Issues regarding preservation or conservation approach, how many artifacts, and where the artifacts would be stored, as well as how information would be shared, became critical. Foundation remains uncovered that were not to be permanently disturbed by construction were preserved in place, while areas to be impacted were documented. GIS 3D spatial analysis was utilized during design for impact evaluation. An interactive Web site was developed and maintained at www.raritanlanding.com; site tours were held in the field during excavations; an educational video was published; and museum displays, an educational teaching package, non-technical monograph, and technical volumes were prepared. Archaeological monitoring and additional data recovery were maintained throughout construction with no hardship to the contractor.

A re-forestation plan was implemented to mitigate the encroachment into the Rutgers Ecological Preserve. Thousands of plantings were incorporated into the project on- and off-site. A fund in the amount of $500,000 was deposited to NJDEP for additional tree planting, which could not be accommodated within the project vicinity. The funds are eligible for tree planting by the County, Municipalities, or a sponsored entity in the project area. A ratio of greater than 2:1 land swap for parkland property used for right-of-way was provided to Johnson Park. Freshwater wetland mitigation was established on-site, and additional mitigation was banked with NJDEP at a 2:1 ratio. Additional bridge spans and extensive retaining wall use was implemented to minimize stream encroachment and wetland disturbance in the

Raritan Floodway. Drilled shaft foundations carried bridge piers to minimize the footprint impacts near the Metlars Brook. Water quality was obtained through best management practices of basins and mechanical treatment devices, the first accepted by DEP. Work restrictions in environmentally sensitive areas and soil erosion and sediment control were mandated in the contract documents.

TEAMWORK

The true success of every project is dependent on teamwork. The Route 18 Extension is a model of true partnership between agencies, institutions, consultants, and communities. Teamwork requires the leadership and commitment from management, and this project had the backing throughout the process. Agencies included FHWA; the owner, NJDOT; many permitting agencies, including the NJDEP, U.S. Army Corps of Engineers (ACOE), U.S. Fish & Wildlife Service, New Jersey Division of the Fish & Game Commission, Green Acres, State Historic Preservation Office; Middlesex County Parks and Recreation, Cultural Commission; the engineering firm, Gannett Fleming, and subconsultants; the general contractor, Slattery; Rutgers University; and Piscataway Township. Teamwork and cooperation were effective elements to the successful completion of this project.

The long history and desire of a transportation solution was the common seed on which goals for success were based. Through stakeholder meetings and partnering, the needs, requirements, and solutions were identified and consensus was built. The environmental constraints were so predominant that Route 18 alignment was essentially "threading a needle" while balancing resource impacts. The NJDEP was instrumental in weighing impacts of competing resources, thus allowing a balance to be found. Without this guidance and consensus, the number of significant permits would not have been attainable. Permits included Freshwater Wetlands Individual Permit, Army Corp Wetlands; Major Stream Encroachment; Redelineation of the Raritan Floodway; Water Quality Certificate; Water Front Development; Green Acres Conveyance of Public Parkland; Reforestation; Potable Water; Sewer Extension; and SHPO - no adverse effect with mitigation.

Rutgers University worked diligently to modify its master plan on its two fastest growing campuses, and accomodated the proper transportation improvement. It entered into a cost-sharing agreement to balance the cost of right-of-way for enhancement improvements. The establishment of the architectural context required Rutgers' acceptance. The development of a round-a-bout as the main terminus of the Bush Campus, 1.9 miles of multi-use path with emergency phone system, and circulation and access changes required the Rutgers and NJDOT partnership. The Cost Sharing Agreement between the NJDOT and Rutgers was the cornerstone of consensus building and teamwork.

The Raritan Landing archaeological data recovery was performed by a team of eight member firms under the Gannett Fleming contract. Four firms provided a total of 40 archaeologists and six principle investigators during a six-month period – the largest NJDOT undertaking – allowed construction to move forward unimpeded. A contractor was hired to clear three to five feet of overburden, and excavation support was managed by Gannett Fleming -- a true team effort!

The Construction Communication Plan was instrumental in maintaining teamwork throughout construction. The team charter established the common goal to commit to providing the resources and effort that resulted in the Route 18 Extension being a quality project. The plan provided the environment for resolution of issues, and the reactive and proactive transfer of information. It identified and established protocol and tools to efficiently inform all stakeholders' customers with real time accurate information, keeping the team together.

INNOVATION AND VALUE

The innovative concepts utilized on this project consisted of new technologies and the diverse utilization of common engineering principles to optimize solutions. The truest innovation is often found in common, simple solutions being applied in unique ways. Innovation leads to a better environment, cost

savings, and/or time savings. Taking the initiative to apply innovation with this approach was extensive on Route 18 Extension.

- Drilled Shafts – Metlars Brook, an environmentally sensitive stream, meanders through the project site and has impacted several bridge pier configurations. Where pier foundations were in close proximity to the stream, the project team considered the use of deep foundation drilled shafts to minimize the footprint of the substructure elements. Compared to a more conventional spread footing, a drilled shaft occupies an area only the size of the shaft itself, thus minimizing both short-term and long-term impacts on the stream. We have used this type of construction in highly congested urban areas where traffic movements are the major factor in dictating foundation types and sizes. We found that this application provides similar advantages when stream encroachment is a defining factor in the selection of appropriate structure types.
- Retaining Wall Joint Treatments – During the design phase, the project team studied a significant amount of material from similar past projects that had incorporated cut stone form liner finishes. There seemed to be one common deficiency in all of the samples. Namely, the prominent feature that detracted from the finished appearance concerned the wall construction/expansion joint treatments. Specifically, on these earlier projects, little effort was made to "hide," or subdue, these joints within the architectural finishes. The result was surfaces where the most visible feature was the wall jointing, not the intended architectural features. This was especially the case with the precast concrete panels on MSE walls, where the patterning of the panels almost completely obscured the stonework patterns. Contrary to these earlier projects, the ultimate objective of this project was, of course, to make the walls look like actual cut stone structures, not concrete walls with architectural finishes. Gannett Fleming worked with the contractor and the contractor's wall suppliers to soften the joints by eliminating or reducing the size of concrete edge chamfers, and by the use of permanent, flexible, stained caulking that, for the most part, was effective in hiding or obscuring the joints. There was resistance by the contractor to revise his standard procedures in order to comply with surface treatment requirements. However, Gannett Fleming's specification was very tight in this regard and, in the final analysis, the contractor had no choice but to comply.
- Two-Stage Retaining Wall – At the west end of the project adjacent to the Raritan River, weak, compressible soil layers, immediately under retaining wall foundations, posed design concerns. Constructing the walls in this area required some form of remediation in order to mitigate future long-term settlements. In the past, the solution would have been to directly remove the weak soils, or apply a preload to consolidate the soils prior to wall construction. At this particular wall location, the weak soil layer was too thick to economically remove, and the preload scheme was not appropriate on staging and scheduling grounds. For applications like this, the MSE wall industry has developed a new system that is both functional and schedule-friendly. The concept involves the construction of a standard MSE wall without the precast concrete facing. The wall is constructed full height in its final position. The weight of this first stage of construction is applied to the compressible weak soils below, and the wall settles. After the settlement has stabilized, the concrete facing panels are hung from the first stage portion, and the wall is complete. Though not the first application of this wall configuration on the Route 18, 2A project, this type of construction is becoming more popular for both temporary and permanent retaining wall installations.
- Electronic transfer of working drawings and RFI's was implemented on this project to expedite the approval process. Gannett Fleming developed a pilot on one other project for the Department, but expanded the capability for the Route 18 Extension. This included upload and download through a protected FTP site, automated e-mail notification, and tracking of all submittals and

RFI's utilizing Expedition software. This allowed management to view the status of all submittals and RFI's, as well as focus on critical path elements expediting the process.

- Modified overhead sign panels were implemented with a color-coded destination text for Rutgers University campuses. Typically, NJDOT would not have advertised the campuses on overhead guide signing, but due to the unusual nature of this highway splitting the campuses, an innovative method was implemented that did not violate the MUTCD Manual.
- Perpetual pavement design was constructed for the 2.1-mile section of highway. This was the largest new constructed continuous highway section in New Jersey to implement this pavement design.
- GIS 3-dimensional spatial analysis was used to analyze the Raritan Landing foundation remains. Hence, designers were able to situate proposed infrastructure to minimize impacts to the archaeological features, allowing the maximum preservation of the Raritan Landing remains. In addition, the public Web site included an interactive GIS tool, which allows viewers to look at the various historic lots and artifacts spatially.

Long – Term Improvement

An effective quality process needs to capture design and construction experiences of today. The innovations and lessons learned on the Route 18 Extension have been and are being documented in the newly established Center of Improvement, which is managed by NJDOT Division of Project Management. This will allow quality issues to cycle through the Quality Management System.

- The Department is moving forward with adopting an electronic working drawing process as a standard operation. The successful experience of this project has resulted in the contracting community embracing the technology.
- The color-coded signs for Rutgers University are being implemented on an adjacent project in the city of New Brunswick, and opening the door for other future applications.
- The two-stage retaining wall connection detail developed by the MSE wall fabricator was recently submitted for a patent.
- The water quality structural treatment devices were first implemented and approved by DEP on this project. Subsequently, the DEP has adopted new regulations allowing the use of the devices.
- The Construction Communication Plan was cutting edge for the Department. The involvement of the key stakeholders and their communication resources and network has been a model for future projects.

The NJDOT mission to "Improve Life by Improving Transportation" is a testament to the commitment of quality.

Route 18 Extension
The Missing Link...
Preserving the Past, and Sustaining the Future

Executive Summary

The New Jersey Department of Transportation (NJDOT) has completed the construction of the Route 18 Extension, Section 2A, in Piscataway Township, Middlesex County, N.J. This much-needed solution eliminates a severe congestion bottleneck and completes the "missing link" in the New Jersey State highway system. On a regional level, the Route 18 Extension provides a continuous four-lane State highway between the existing Route 18 northerly terminus at River Road and Interstate 287.

Portions of the existing road network began as an important overland transportation route in the 1700s. Carrying more than 40,000 vehicles daily, its level of importance to the local community, Rutgers, The State University, and the Piscataway Township Business Center continues to grow. The extension provides a continuous multi-lane arterial highway and facilitates local and regional trips through the elimination of the existing bottleneck condition.

The project team faced numerous challenges while planning to make the "missing link" a reality. First and foremost was completing the $5.8 million data recovery project to preserve the Raritan Landing Archaeological District, an 18th century port community that underlies the roadway, prior to construction of the extension. This was the largest single archaeological data recovery undertaking sponsored by the NJDOT.

In an unprecedented timeframe, by involving experts from across the country and utilizing innovative technology, the project team completed the extensive data recovery in five months, ahead of schedule. Throughout this effort, it was of utmost importance to the NJDOT to provide information to the public and historians about every aspect of the project, artifacts recovered, and people who inhabited Raritan Landing more than 200 years ago.

Other challenges the project team faced included balancing environmental and socioeconomic resources, as well as communicating with many stakeholders. In order to mitigate environmental impacts, the team implemented a re-forestation plan, parkland conveyance, and wetland restoration and banking. By utilizing an extensive communication network and engaging the local public, the project team built tremendous consensus among the competing resources and views.

Teamwork truly was the heralding feature of this project, and it had numerous benefits. First, by listening to the community and working closely with the contractor, designer, subcontractors, and material suppliers, the project team was able to implement numerous innovations. One example includes the electronic transfer of working drawings and RFIs to expedite the approval process. In fact, this method was piloted by the designer on a former project for the NJDOT and perfected on the Route 18 Extension. Modified overhead sign panels for Rutgers University and the use of perpetual pavement for the entire 2.1-mile-long extension constitute other examples.

Teamwork also resulted in a context-sensitive solution, which included numerous architectural and aesthetic enhancements building off of the rich historic heritage of the Raritan Landing. Stained architectural concrete detailing on all surfaces of bridge abutments, walls, and piers, along with elements like haunch girders and decorative lighting, enabled the "missing link" to be seamlessly integrated into the surrounding landscape. Two miles of multi-use paths with historic interpretive signing today are enhancing residents' quality of life.

In every aspect of this multi-faceted project, the "missing link" has preserved the past and sustained future transportation improvements for the benefit of motorists and pedestrians.

ROUTE
THE
PRESE
AND SUST

Form QMS111 11/22/2004

New Jersey Department of Transportation

Corrective Action Request

Quality Management Services

From: **Ms. Lynn Rich, Director**
Quality Management Services
P. O. Box 600
1035 Parkway Avenue
Trenton NJ 08625
Telephone: (609) 530-5367

(1)
To: **Recipient Name**
Recipient Title or Addre
Recipient Address
Recipient Address or De

Telephone:

Area of Nonconformance or Quality Issue:

☐ Construction ☐ Project Management ☐ Right of Way ☐
☐ Utilities ☐ Environmental ☐ Program Control ☐
☐ Other:

Problem Statement:

Response Statement: (2)

Corrective Action Plan Accepted By QMS: ☐

Approved By:

_____

SEE INSTRUCTIONS OR VISIT http://www.st

ual Page 1 of 6

Form QMS110 11/22/

pital Project Procedures

DRAFT

Process Improvement Manual

(1)
Date:
From: Name of
Address
Address
Address

Telephone:

Area of Non-C
☐ Construct
☐ Utilities
☐ Other:

Name of Initiat

Organization C

Route & Sectio

Federal Projec

Project Descri

Description: (

Corrective Ac

SEE IN

ormance
nd

ervices (QMS) has implemented this procedure to standardize the process
orting Non-Conformance issues during design and construction. The use
e form (QMS110 (doc 106k)) will also serve to notify QMS of significant
e Department can use this form to track and recognize trends and take
event similar problems from happening to other projects.

ed with the QMS110 (doc 106k) for recipients unfamiliar with the form, to
nd correctly, to expedite the processing and corrective action approval.
ible for including as many specific details of the Non-Conformance, so
the project will be able to ascertain the problem and act accordingly.

his procedure is to standardize and improve our project delivery system.
ng Non-Conformance is not intended for use as a punitive measure, and
ns should be resolved directly between the involved organizations. For the
cedure for dealing with Consultant deficiencies, see the Consultant &
e Review Manual.

nagement (CPM) units involved in the project delivery process shall use
0 (doc 106k) can be initiated by any person within CPM, when a problem has
not immediately resolved. The initiator of QMS110 must submit it through
visor to the Configuration Management Section (Bureau of Value
pies to the Manager, Bureau of Value Management, and the appropriate

rmance can be errors or omissions, delays which affect the project
ator s ability to meet project deadlines, late submissions, cost overruns,
to projects, schedules, plans, etc., or non-compliance with established
pecifications or Project Specific Quality Assurance Plans. In general, any
project delivery system or a specific project's quality, schedule, or
d in this manner.

a paper copy, attach additional pages if needed and indicate how many
on the form.
an electronic MS Word copy, the fields will expand to the amount of detail
No additional attachments should be necessary.

ent of QMS110 (doc 106k) to resolve administrative or disciplinary problems.
ered, and governed by the Department's Policies and Procedures.

ng

sportation/eng/documents/pimanual/pimanual.shtm 5/4/2005

Route 18 Extension
The Missing Link...
Preserving the Past, and Sustaining the Future

Appendix 1

NJDOT Quality Management
Quality Assurance Reporting

Form QMS111 11/22/2004

New Jersey Department of Transportation
Corrective Action Request
Quality Management Services

Number:
Issued:

From: **Ms. Lynn Rich, Director**
Quality Management Services
P. O. Box 600
1035 Parkway Avenue
Trenton NJ 08625
Telephone: (609) 530-5367

(1)
To: **Recipient Name**
Recipient Title or Address
Recipient Address
Recipient Address or Delete Text

Telephone:

Area of Nonconformance or Quality Issue:

☐ Construction ☐ Project Management ☐ Right of Way ☐ Scope ☐ Permits
☐ Utilities ☐ Environmental ☐ Program Control ☐ Survey ☐ Design
☐ Other:

Problem Statement:

Response Statement: (2)

Corrective Action Plan Accepted By QMS: ☐

Approved By:

_____

SEE INSTRUCTIONS OR VISIT http://www.st

Form QMS110 11/22/2004

New Jersey Department of Transportation
Non-Conformance/Quality Issue
Quality Management Services

Number:
Issued:

(1)
Date:
From: Name of Initiator
Address or Title of Initiator
Address of Initiator
Address of Initiator or Delete Text

To:
Configuration Management
7th Floor, E&O Building
1035 Parkway Avenue
P. O. Box 600
Trenton, NJ 08625
c: Richard Jaffe, Manager
Telephone: (609) 530-3022

Telephone:

Area of Non-Conformance ☐ or Quality Issue ☐: (2)

☐ Construction ☐ Project Management ☐ Right of Way ☐ Scope ☐ Permits
☐ Utilities ☐ Environmental ☐ Program Control ☐ Survey ☐ Design
☐ Other:

Name of Initiator if Different than Addressee: (3)

Organization Committing Non-Conformance ☐
Or Quality Issue ☐: (4)

Route & Section: (5) | UPC No: (7)

Federal Project No.: (6) | County/Municipality: (8)

Project Description: (9)

Description: (10)

Corrective Action Plan Required? ☐Yes ☐No

SEE INSTRUCTIONS OR VISIT http://www.state.nj.us/transportation/eng/documents/procedures/

Form QMS112 11/22/2004

New Jersey Department of Transportation
Process Improvement Recommendation
Quality Management Services

Number:
Issued:

(1)
Date:
From: Name of Initiator
Address or Title of Initiator
Address of Initiator
Address of Initiator or Delete Text

To: **Daniel Pankiewicz**
Configuration Management
7th Floor, E&O Building
1035 Parkway Avenue
P.O. Box 600
Trenton, NJ 08625
c: Richard Jaffe, Manager
Telephone: (609) 530-3022

Telephone:

Process Affected: (2)

☐ Construction ☐ Project Management ☐ Right of Way ☐ Scope ☐ Permits
☐ Utilities ☐ Environmental ☐ Pro
☐ Other:

Problem Area (3)

Suggested Improvement: (4)

Immediate Action:

Final Action:

Process Improvement Required? ☐Yes ☐No

SEE INSTRUCTIONS OR VISIT http://www.state.nj.us/

Process Improvement Manual — Page 1 of 6

Capital Project Procedures

Process Improvement Manual

1 Non-Conformance
1.1 Background

Quality Management Services (QMS) has implemented this procedure to standardize the process of recognizing and reporting Non-Conformance issues during design and construction. The use of the Non-Conformance form (QMS110 (doc 106k)) will also serve to notify QMS of significant recurring problems. The Department can use this form to track and recognize trends and take corrective action to prevent similar problems from happening to other projects.

Instructions are included with the QMS110 (doc 106k) for recipients unfamiliar with the form, to understand and respond correctly, to expedite the processing and corrective action approval. The initiator is responsible for including as many specific details of the Non-Conformance, so those not familiar with the project will be able to ascertain the problem and act accordingly.

NOTE: The intent of this procedure is to standardize and improve our project delivery system. This method of reporting Non-Conformance is not intended for use as a punitive measure, and in most cases, problems should be resolved directly between the involved organizations. For the Project Manager's procedure for dealing with Consultant deficiencies, see the Consultant & Contractor Performance Review Manual.

1.2 Initiation

All Capital Program Management (CPM) units involved in the project delivery process shall use Form QMS110. QMS110 (doc 106k) can be initiated by any person within CPM, when a problem has been identified that is not immediately resolved. The initiator of QMS110 must submit it through their immediate supervisor to the Configuration Management Section (Bureau of Value Management), with copies to the Manager, Bureau of Value Management, and the appropriate Program Manager.

The area of Non-Conformance can be errors or omissions, delays which affect the project schedule or the originator's ability to meet project deadlines, late submissions, cost overruns, unauthorized changes to projects, schedules, plans, etc., or non-compliance with established policies, procedures, specifications or Project Specific Quality Assurance Plans. In general, any problem related to the project delivery system or a specific project's quality, schedule, or budget can be reported in this manner.

- If filling in a paper copy, attach additional pages if needed and indicate how many additional on the form.
- If filling in an electronic MS Word copy, the fields will expand to the amount of detail necessary. No additional attachments should be necessary.

Note: It is not the intent of QMS110 (doc 106k) to resolve administrative or disciplinary problems. These matters are covered, and governed by the Department's Policies and Procedures.

1.3 Processing

http://www.state.nj.us/transportation/eng/documents/pimanual/pimanual.shtm 5/4/2005

DEPARTMENT OF TRANSPORTATION
THE STATE OF NEW JERSEY
DRAFT

ROUTE 1
THE M
PRESERV
AND SUSTAI

DESIGN

PROJECT EXECUTION PLAN
NEW JERSEY DEAPRTMENT OF TRANSPORTATION

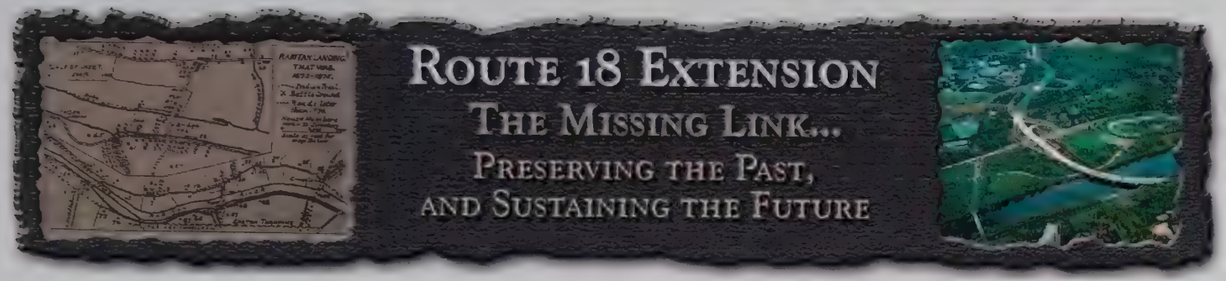
AGREEMENT NO. 91D302
Route 18 Extension, Section 2A
Piscataway Township, Middlesex County, NJ

CONTENTS

Section	Title	Page
I.	PROJECTBACKGROUND	1
II.	PROJECT EXECTION PLAN	2
	PROJECT EXECUTION PLAN GOAL	2
	DISTRIBUTION	2
	RESPONSIBILITY	4
	INSERT: PROJECT ORGANIZATION CHART	
	QUALITY ASSURANCE FILES	5
	QUALITY ASSURANCE REPORT	5
	INSERT: QUALITY ASSURANCE REPORT	
	PROGRESS REPORT PROCEDURES	6
	INSERT: MONTHLY PROGRESS REPORT	
	PRE-SUBMITTAL REVIEW PROCESS	7
	REVIEW PROCESS7	
	POST-SUBMITTIAL REVIEW PROCESS	7
	INSERT: GANNETT FLEMING REVIEW COMMENT REGISTER	
	INSERT: GANNETT FLEMING INTERNAL REVIEW REGISTER	
	MATERIAL FLOW PATHS	8
III.	PROJECT CONTROL	9
	INTERNAL MEETINGS	9
	TEAM MEETINGS	9
	SCOPE REQUIREMENTS9	
	INSERT: CHANGE IN SCOPE FORM	
	SCOPE OF SERVICES	10
	CHAIN OF COMMAND	10
	SCHEDULE	10
	INSERT: PROJECT SCHEDULE	
	PROJECT DIRECTORY	11
	INSERT: RECORD OF TELEPHONE CONVERSATION	
	SUBNUMBERS / BUDGETS	12
	INSERT: SUB JOB ASSIGNMENT	
IV.	DRAWING CONTROL	13
	DESIGN CRITERIA	13
	CALCULATIONS	14
	WORKING DRAWING LIST	15
	DRAWING CONTROL REGISTER	15
	START-UP	17
	KICKOFF MEETING	17
	DOCUMENT CONTROL	19
	FILE KEY	20
	APPENDIX A	
	SCOPE OF SERVICES	

New Jersey
rtment of Transportation
tificate of Achievement
presented to
lattery Skanska, Inc.
an outstanding contribution to
Work Zone Safety
Rt. 18, Sec. 2A
April 1, 2004

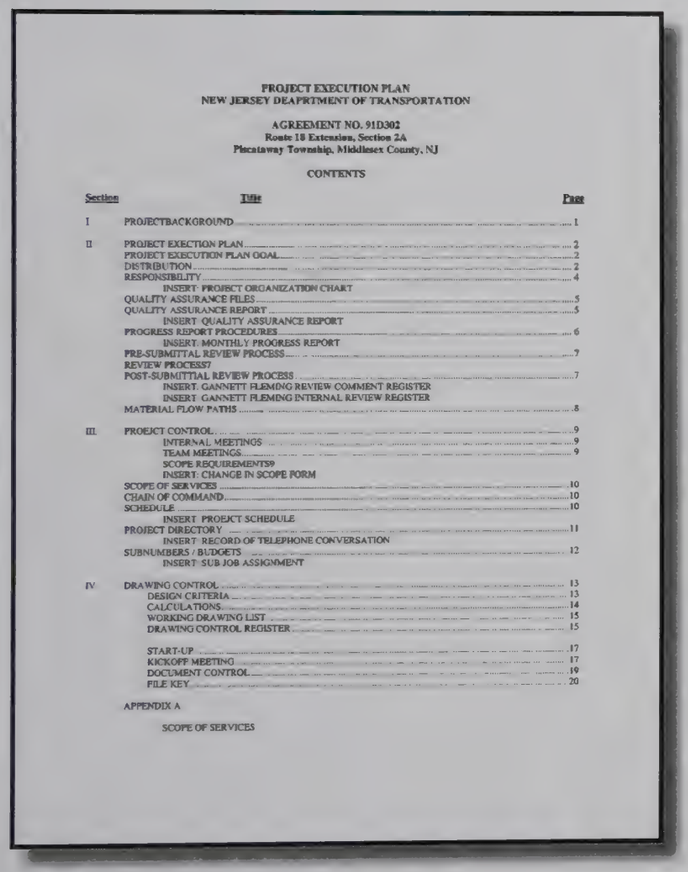
John Lettiere
Commissioner
of
Transportation



APPENDIX 2

PROJECT SPECIFIC QC/QA

DESIGN



PROJECT EXECUTION PLAN
NEW JERSEY DEAPRTMENT OF TRANSPORTATION

AGREEMENT NO. 91D302
Route 18 Extension, Section 2A
Piscataway Township, Middlesex County, NJ

CONTENTS

Section	Title	Page
I	PROJECTBACKGROUND	1
II	PROJECT EXECTION PLAN	2
	PROJECT EXECUTION PLAN GOAL	2
	DISTRIBUTION	2
	RESPONSIBILITY	4
	INSERT: PROJECT ORGANIZATION CHART	
	QUALITY ASSURANCE FILES	5
	QUALITY ASSURANCE REPORT	5
	INSERT: QUALITY ASSURANCE REPORT	
	PROGRESS REPORT PROCEDURES	6
	INSERT: MONTHLY PROGRESS REPORT	
	PRE-SUBMITTAL REVIEW PROCESS	7
	REVIEW PROCESS?	
	POST-SUBMITTIAL REVIEW PROCESS	7
	INSERT: GANNETT FLEMING REVIEW COMMENT REGISTER	
	INSERT: GANNETT FLEMING INTERNAL REVIEW REGISTER	
	MATERIAL FLOW PATHS	8
III.	PROJECT CONTROL	9
	INTERNAL MEETINGS	9
	TEAM MEETINGS	9
	SCOPE REQUIREMENTS?	
	INSERT: CHANGE IN SCOPE FORM	
	SCOPE OF SERVICES	10
	CHAIN OF COMMAND	10
	SCHEDULE	10
	INSERT: PROJECT SCHEDULE	
	PROJECT DIRECTORY	11
	INSERT: RECORD OF TELEPHONE CONVERSATION	
	SUBNUMBERS / BUDGETS	12
	INSERT: SUB JOB ASSIGNMENT	
IV	DRAWING CONTROL	13
	DESIGN CRITERIA	13
	CALCULATIONS	14
	WORKING DRAWING LIST	15
	DRAWING CONTROL REGISTER	15
	START-UP	17
	KICKOFF MEETING	17
	DOCUMENT CONTROL	19
	FILE KEY	20
APPENDIX A		
	SCOPE OF SERVICES	

CONSTRUCTION

NSF-ISR — NSF International Strategic Registrations, Ltd. — NSF-ISR
A Subsidiary of NSF International
789 North Dixboro Road, Ann Arbor, Michigan 48105
(888) NSF-9000

Certificate of Registration
This certifies that the Environmental Management System of

SLATTERY SKANSKA, INC.
16-16 Whitestone Expressway
Whitestone, NY 11357

has been assessed by NSF-ISR and found to be in conformance to the following standard(s)

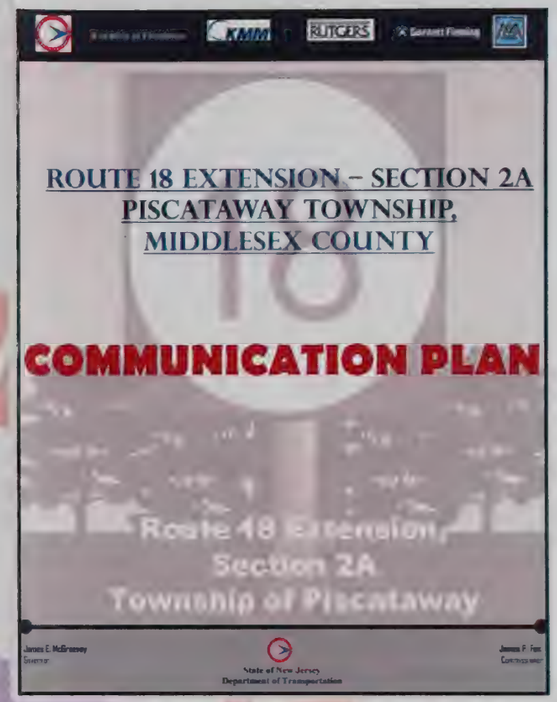
ISO 14001:1996

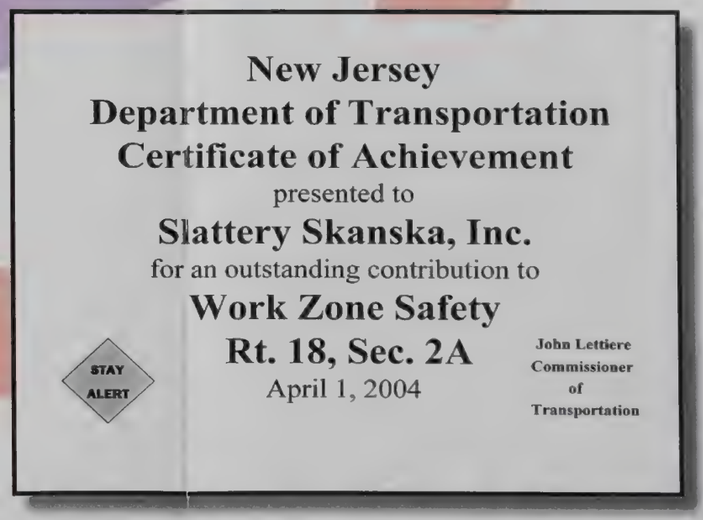
Scope of Registration:
The Skanska USA Civil, Inc. Environmental Management System for all operations and construction sites for Slattery Skanska Inc. headquartered in Whitestone, NY and its subsidiary, Underpinning and Foundation Constructors, Inc., Maspeth, NY

NSF
Environmental Management System Registered to ISO 14001:1996

Certificate Number:	92363-E3
Certificate Issue Date:	08/16/2004
Company Initial Date:	11/20/2002
Registration Date	08/03/2004
Expiration Date*	08/03/2007

Kevan P. Lawlor, President
NSF-ISR





New Jersey
Department of Transportation
Certificate of Achievement
presented to
Slattery Skanska, Inc.
for an outstanding contribution to
Work Zone Safety
Rt. 18, Sec. 2A
April 1, 2004

STAY ALERT

John Lettiere
Commissioner
of
Transportation

Route 18
The M
Preserv
and Sustain

Few projects are as multi-faceted as was the Route 18 Extensio
Landing Archaeological District, the project team was committe
complex interchange and roadway alignments of this project "th
environmental resources.

Environmental Constraints

- Freshwater Wetlands
- Raritan River Floodway - Flood plain
- Metlars Brook Floodway - Flood plain
- Rutgers Ecological Preserve
- Johnson Park
- Raritan Landing Archaeology District
- Historic Low House
- Historic Metlars House
- Rutgers President's House.

Reforestation Plan

- Partnered with Rutgers University, Piscataway Township, and
  (NJDEP) to find best mitigation solution
- Inventoried trees in Rutgers Ecological Preserve
- Salvaged trees within Loop Ramp
- Replanted 5,000 trees within project limits and 5,000 addition
- Provided $500,000 into NJDEP fund to help mitigate tree plan
- Planted trees on other properties - mitigated through conveya
  This was done on land contiguous with the existing parkland.

Techniques to Minimize Environmental

- Bridge spans - extended spans across floodplain to minimize
- Retaining walls - minimized embankment and wetland encroa
- Bridge foundations/drilled shafts - added in close proximity t
  disturbance and brook disturbance
- Open-bottom arch culverts
- Stone-lined culverts
- Water quality swales/basin
- Stormwater clarifiers - remove contaminated sediment, floati
  into Raritan River
- Archaeological data recovery plan
- Construction moratorium during fish spawning and deer rut s

Route 18 Extension

The Missing Link...

Preserving the Past, and Sustaining the Future

Appendix 3

Environmental Stewardship Balancing Resources

Few projects are as multi-faceted as was the Route 18 Extension project. In addition to minimizing impacts to the Raritan Landing Archaeological District, the project team was committed to preserving and mitigating environmental impacts. The complex interchange and roadway alignments of this project "thread the needle" and balance impacts to the following competing environmental resources.

Environmental Constraints

- Freshwater Wetlands
- Raritan River Floodway - Flood plain
- Metlars Brook Floodway - Flood plain
- Rutgers Ecological Preserve
- Johnson Park
- Raritan Landing Archaeology District
- Historic Low House
- Historic Metlars House
- Rutgers President's House.

Mitigation

- Freshwater wetland restoration and banking
- Stream realignment
- Parkland conveyance
- Re-forestation
- Aesthetics - archaeological enhancements
- Archaeological preservation and conservation
- 12 residential relocations.

Reforestation Plan

- Partnered with Rutgers University, Piscataway Township, and the New Jersey Department of Environmental Protection (NJDEP) to find best mitigation solution
- Inventoried trees in Rutgers Ecological Preserve
- Salvaged trees within Loop Ramp
- Replanted 5,000 trees within project limits and 5,000 additional trees throughout community
- Provided $500,000 into NJDEP fund to help mitigate tree plantings
- Planted trees on other properties - mitigated through conveyance by planting two trees for every one that needed to be removed. This was done on land contiguous with the existing parkland.

Techniques to Minimize Environmental Impact

- Bridge spans - extended spans across floodplain to minimize disturbances to wetlands and fill quantity in flooding areas
- Retaining walls - minimized embankment and wetland encroachment, and impact to historic properties
- Bridge foundations/drilled shafts - added in close proximity to Metlars Brook to minimize net fill in the floodplain/wetland disturbance and brook disturbance
- Open-bottom arch culverts
- Stone-lined culverts
- Water quality swales/basin
- Stormwater clarifiers - remove contaminated sediment, floating hydrocarbons, and debris from surface runoff before discharging into Raritan River
- Archaeological data recovery plan
- Construction moratorium during fish spawning and deer rut season.

Route
The
Prese
and Sust

Raritan Landing Data Recovery

The New Jersey Department of Transportation's (NJDOT)
of Historic Places Archaeological District is located in the

This project modernizes portions of roadway that began as
preserve the archaeological importance of the buried port o
were conducted in advance of the construction contract, uti
earth removal.

The use of current technology, including data collection, di
with the historic preservation and public outreach portions

Project Features

- 14 historic archaeological properties
- Prehistoric archaeological site
- The first NJDOT archaeological project Web site
- Interactive GIS available through Web site
- More than one million artifacts recovered
- 78,000 cubic feet of soil excavated.

Challenges

- Preservation of a National Register District while addres
- Performance of a data recovery on 13 sites in advance of
- Identification of an in-place feature preservation
- Utilization of a construction contractor to remove one to
- Provide timely information to designers, interested publi

Solutions

- Created team of 40 archaeologists to conduct the excavat
- Provided a logistical support and construction manageme
- Electronic data collection and "real time" GIS spatial an
  within the project limits
- Utilized Web-based solutions and teaching tools to enha

Route 18 Extension
The Missing Link...
Preserving the Past, and Sustaining the Future

Appendix 4

Environmental Stewardship
Archaeological Data Recovery

Raritan Landing Data Recovery

The New Jersey Department of Transportation's (NJDOT) $5.8 million project to preserve the Raritan Landing National Register of Historic Places Archaeological District is located in the "Missing Link" of Route 18.

This project modernizes portions of roadway that began as an important overland transportation route in the 1700s. In order to preserve the archaeological importance of the buried port of Raritan Landing in an accelerated schedule, large-scale excavations were conducted in advance of the construction contract, utilizing multiple archaeological firms and a construction contractor for earth removal.

The use of current technology, including data collection, digital mapping, GIS, and Web-based solutions, has been an essential aid with the historic preservation and public outreach portions of the project.

Project Features

- 14 historic archaeological properties
- Prehistoric archaeological site
- The first NJDOT archaeological project Web site
- Interactive GIS available through Web site
- More than one million artifacts recovered
- 78,000 cubic feet of soil excavated.

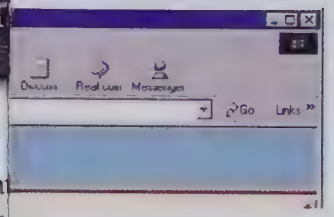
Challenges

- Preservation of a National Register District while addressing transportation needs
- Performance of a data recovery on 13 sites in advance of construction
- Identification of an in-place feature preservation
- Utilization of a construction contractor to remove one to five feet soil of overburden in a floodplain without disturbing artifacts
- Provide timely information to designers, interested public, and historians.

Solutions

- Created team of 40 archaeologists to conduct the excavation in five months, which was an unprecedented timeframe
- Provided a logistical support and construction management team to enable archaeological project to maintain schedule
- Electronic data collection and "real time" GIS spatial analysis enabled preservation of unaffected archaeological resources within the project limits
- Utilized Web-based solutions and teaching tools to enhance the community outreach concerns.

Route
The
Prese
and Sust



Throughout the 24-month, $5.8 million Raritan Landing dat
public, scholars, and students of all ages, including those in
community through education was an important aspect of th

Public Site Tours

- Weekly tours conducted for schools, special interest group
- School group presentations
- Temporary and permanent exhibits of artifacts
- Project supervisors available to answer questions and prov
- Almost the entire excavation was open for viewing.

Web Site – www.raritanlanding.com

- First archaeological project Web site for the NJDOT
  - Provides information about the Route 18 Extension proj investigations
- Interactive geographic information system (GIS)
  - Used to collect and organize information, as well as diss
  - User-friendly -- Allows any user to query and explore th
- Weekly updates of real-time information
- Historical research about inhabitants of Raritan Landing
- Information about previous investigations
- Weekly tour information
- Related links of interest for public.

Documentary Video

- Video to air on local television included in educational pa

Educational Package

- Museum display at East Jersey Olde Towne
- Interactive CD-ROM
- Teaching outline and bibliography – reference for teacher
- Professional edited volume for "Academia"
- Non-technical monograph for public.

Route 18 Extension
The Missing Link...
Preserving the Past, and Sustaining the Future

Appendix 5

History: Giving back through Education

Throughout the 24-month, $5.8 million Raritan Landing data recovery project, a wealth of information was given to the general public, scholars, and students of all ages, including those in elementary school, high school, and college. Giving back to the community through education was an important aspect of this publicly funded archaeology project.

Public Site Tours

- Weekly tours conducted for schools, special interest groups like the Boy Scouts, historians, and the local community
- School group presentations
- Temporary and permanent exhibits of artifacts
- Project supervisors available to answer questions and provide up-to-date information during public tours
- Almost the entire excavation was open for viewing.

Web Site – www.raritanlanding.com

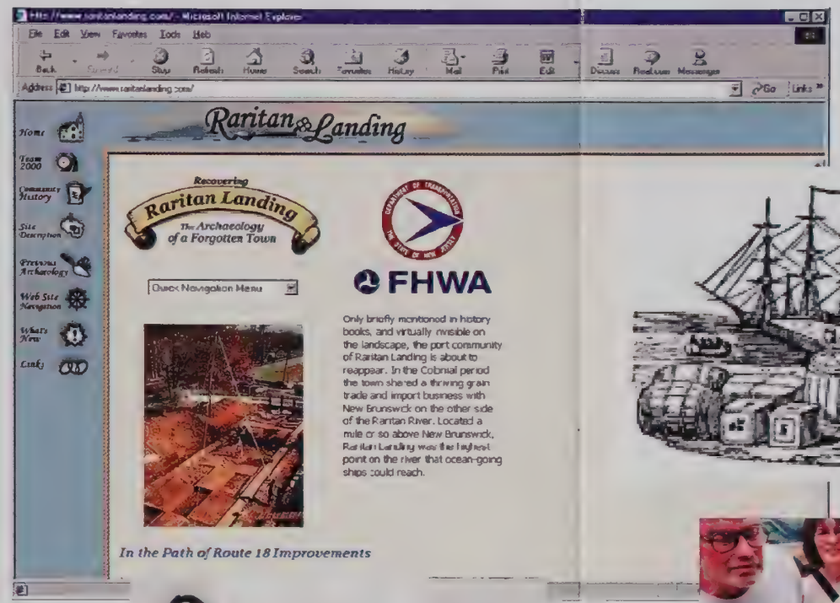
- First archaeological project Web site for the NJDOT
  - Provides information about the Route 18 Extension project, as well as past and present information about the archaeological investigations
- Interactive geographic information system (GIS)
  - Used to collect and organize information, as well as disseminate information to the public
  - User-friendly -- Allows any user to query and explore the archaeological project
- Weekly updates of real-time information
- Historical research about inhabitants of Raritan Landing
- Information about previous investigations
- Weekly tour information
- Related links of interest for public.

Documentary Video

- Video to air on local television included in educational package tools.

Educational Package

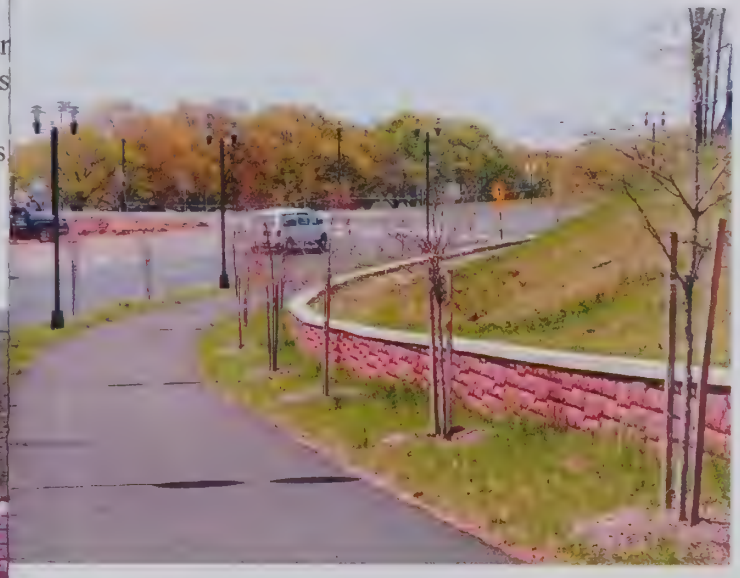
- Museum display at East Jersey Olde Towne
- Interactive CD-ROM
- Teaching outline and bibliography – reference for teachers
- Professional edited volume for "Academia"
- Non-technical monograph for public.


Raritan Landing
Recovering Raritan Landing
The Archaeology of a Forgotten Town
FHWA
Only briefly mentioned in history books, and virtually invisible on the landscape, the port community of Raritan Landing is about to reappear. In the Colonial period the town shared a thriving grain trade and import business with New Brunswick on the other side of the Raritan River. Located a mile or so above New Brunswick, Raritan Landing was the highest point on the river that ocean-going ships could reach.
In the Path of Route 18 Improvements

ROUTE
THE
PRESE
AND SUST

The project team went to great lengths to ensure that every a
into the surrounding landscape. Close coordination between
surfaces and steel girder superstructure elements. The follov
incorporated into the project.

- Concrete surfacing treatment and staining of bridge abutn
  received similar treatment
- Appearance mimics large cut stone surfaces
- Painted steel elements of structures and haunch girders
- Final paint color on steel elements complements appearar
- Decorative fence (angle top on bridges), lighting, traffic s
- Landscape walls – 1,600 linear feet along campus road
- Utilization of granite block and concrete pavers for curbs



Route 18 Extension

The Missing Link...

Preserving the Past, and Sustaining the Future

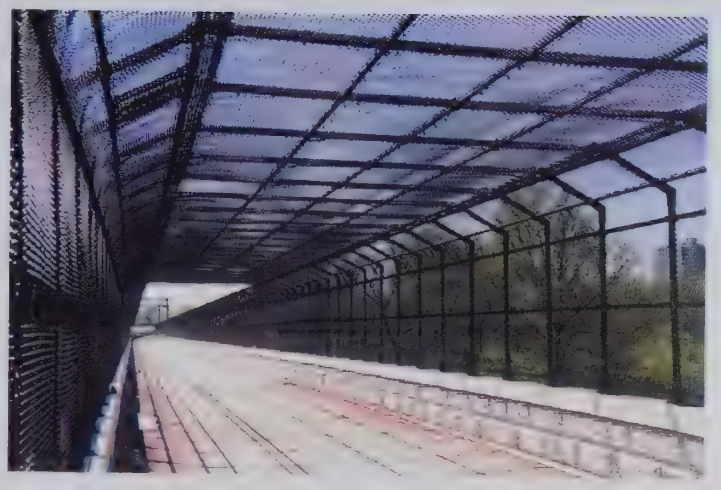
Appendix 6

Project Enhancements and Architectural Treatments

The project team went to great lengths to ensure that every aspect of the Route 18 Extension project was seamlessly integrated into the surrounding landscape. Close coordination between stakeholders was key to the final appearance of the exposed concrete surfaces and steel girder superstructure elements. The following offers the architectural and aesthetic treatments that were incorporated into the project.

- Concrete surfacing treatment and staining of bridge abutments, piers, and columns; retaining walls, barriers, and culverts received similar treatment
- Appearance mimics large cut stone surfaces
- Painted steel elements of structures and haunch girders
- Final paint color on steel elements complements appearance of concrete elements
- Decorative fence (angle top on bridges), lighting, traffic signals, and sign support structures
- Landscape walls – 1,600 linear feet along campus road
- Utilization of granite block and concrete pavers for curbs, islands, crosswalks, and slope protection.

ROUTE
THE
PRESE
AND SUST



Providing connectivity through the Township of Piscataway and Rutgers University involved the construction of 1.9 miles of multi-use pathways.

THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS
University Planning & Development
Rutgers, The State University of New Jersey
Livingston Campus • Piscataway, New Jersey 08854-80
Office 732/445-2430 • FAX 732/445-3721

April 11, 2005

Mr. John McCleery
Project Manager
New Jersey Department of Transportation
1035 Parkway Avenue CN 600
Trenton, New Jersey 08625

RE: Route 18 Extension – Section 2A
Piscataway Township, Middlesex County

Dear Mr. McCleery

Rutgers, The State University of New Jersey would like to extend our s
Jersey Department of Transportation and their consultant Gannett Fleming, I
Route 18 Extension project. The department's attention to detail, commitment to
well as quality engineering, produced a project that will benefit the university for

The many partnering sessions and design workshops resulted in a
university's needs and significantly improved the traffic conditions around
sensitive solutions incorporated a round-about, architectural treatments and
complimented the surrounding collegiate environment and provided gateways
and Livingston Campuses.

The Communication Plan that was established for the project was
University appraised of the construction status and traffic conditions. T
maintain the efficient operation of its bus system, the second largest bus-style
which moves over 45,000 students per day.

The Multi-Use-Path network throughout the project corridor
university's campuses, and provides linkages to surrounding municipal and
and Johnson Park Systems. The Multi-Use-Path has been enhanced by th
of the Raritan Landing via interpretive network on wayside signing
landscaping. The enclosure of an emergency communications system will
multi-modal environment for bicyclists and pedestrians.

Again, thank you

MUNICIPAL COMPLEX • PISCA
TOWNSHIP OF PI

Mr. John McCleery, Project Manager
New Jersey Department of Transporta
1035 Parkway Avenue, CN 600
Trenton, NJ 08625

RE: Route 18 Extension – Section 2A
Piscataway Township - Middlese

Dear Mr McCleery:

At long last the Route 18 Extension –
As the Mayor of this community in wh
thoroughly familiar with every roadway
so than what is referred to as Route 18
Extension has been promised for over
the reality of actually riding on this hi
My office has received many calls fro
people who live in Piscataway, but fru
and through our community on a daily
with this new – state-of-the-art - roadw

Whenever an issue regarding Section
er by a resident or a business you, as
responded and the issue was quickly
lines of communication that were kept
the local government.

The design and structural aspects of
issues, as well as the overall landsca
of Piscataway are grateful for your c
commitment to this project.

Best wishes for future success

HOME NEWS TRIBUNE

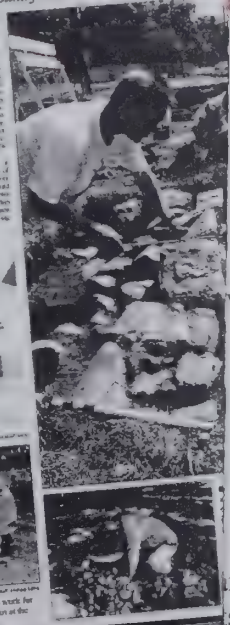
LOCAL

Friday, August 18, 2000

CENTRAL N.J.:
EATONTOWN:
NEW JERSEY:

Remains of port unearthed

Raritan River dig may have found foundations of homes, stores



Land giveaway is offset by benefits along Rt. 18

Rutgers has been meeting with the DOT since 1981 to re
view and discuss the project
and how it would impact the
university and surrounding
communities. Rutgers has re
quested DOT include a bicycle
and pedestrian path along the
entire length of the highway. In
addition, Rutgers has requested
the DOT to reforest and land
scape those areas that border
the preserve and the campus.

The editorial also took issue
with the recent hearing at
which this land transfer was
addressed. It should be noted
the DOT held a public hearing
in 1998 as part of its planning
process. The board of preserve
holds a public hearing and ad
vertised it ahead of time within
the university community as a
matter of courtesy.

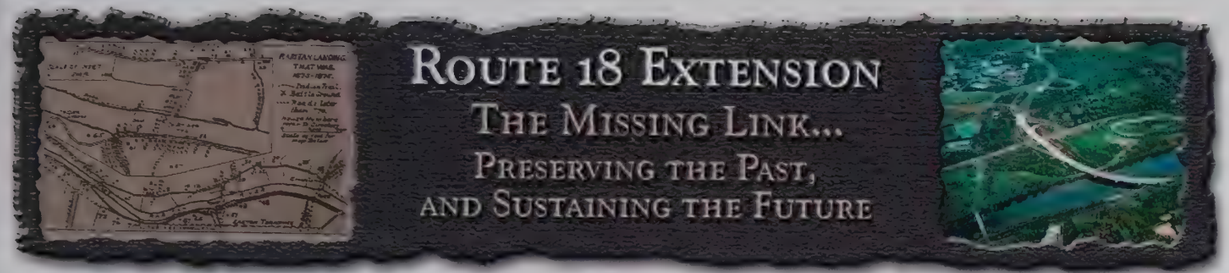
The hearing was held on Feb.
because that was the date of
the first regularly scheduled
board of governors meeting
after Rutgers was formally noti
fied in December by DOT of the
exact parcels of land it was
planning to take for the project.
It was held in Newark because
the board of governors had been
rescheduled to meet that day
on the Newark campus.

The Route 18 extension will
unquestionably improve traffic
flow for the many area resi
dents who use this major road
way on a regular basis.

Frank Wong
County Counsel and Legal
Counsel of Rutgers University
New Jersey

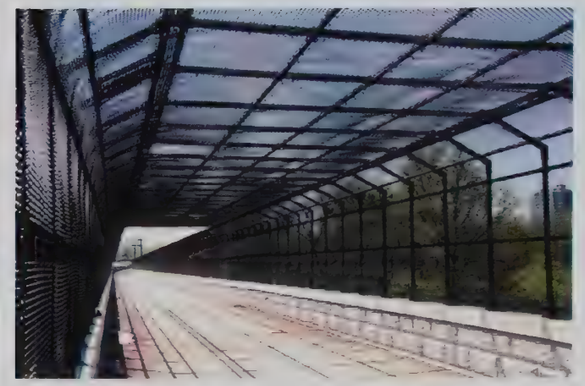
vide the user
Landing Historic

reness, an Emergency
s directly to Rutgers
the pathways.

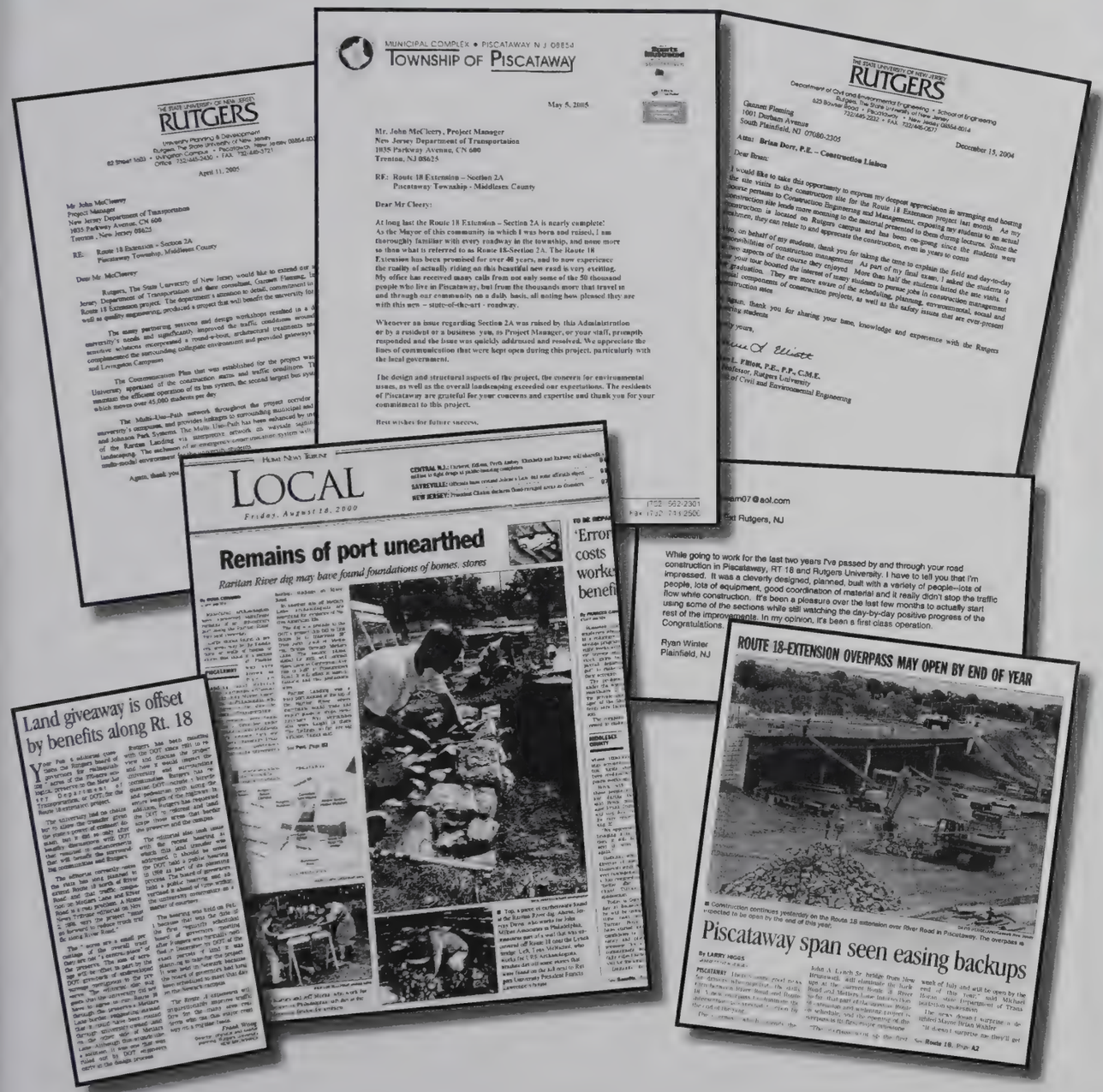


APPENDIX 7

COMMUNITY FOCUS



Providing connectivity through the Township of Piscataway and Rutgers University involved the construction of 1.9 miles of multi-use pathways.

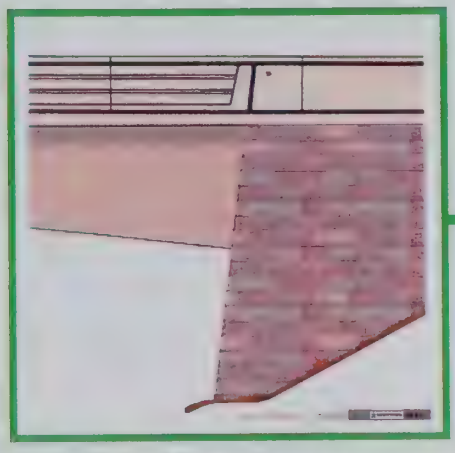

RUTGERS
TOWNSHIP OF PISCATAWAY
LOCAL
Remains of port unearthed
Land giveaway is offset by benefits along Rt. 18
ROUTE 18-EXTENSION OVERPASS MAY OPEN BY END OF YEAR
Piscataway span seen easing backups

Interpretative signs were installed along the pathways to provide the user with a link to the past and the important role that the Raritan Landing Historic District played in future development.

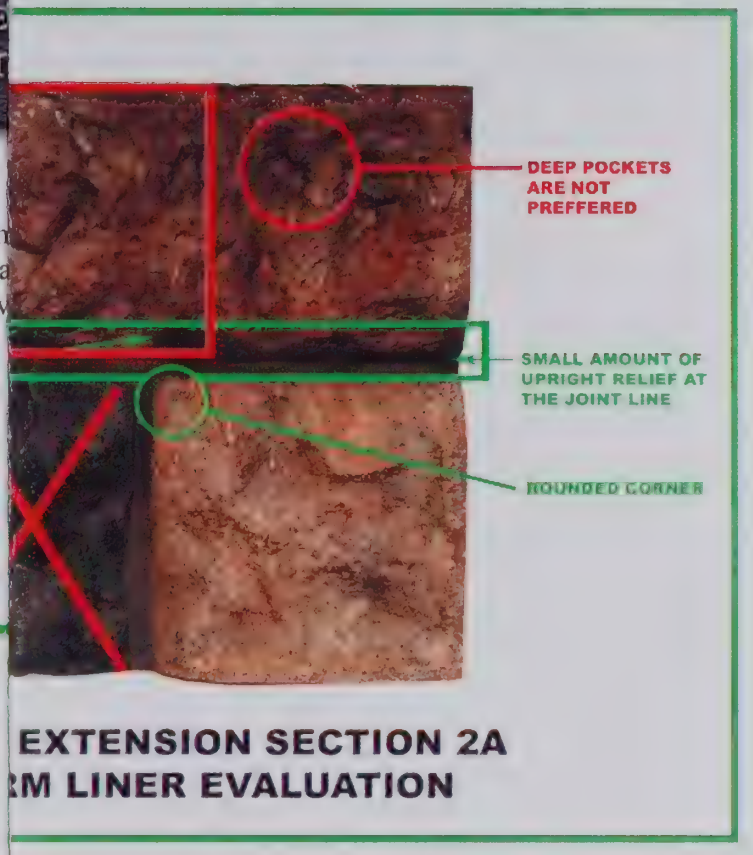
To promote safety and awareness, an Emergency Phone System that connects directly to Rutgers police was installed along the pathways.

Route
The
Prese
and Sust

The flowchart shown depicts the comprehensive process en
and application. This well-conceived plan of close coordina
successfully completed project with significant and effectiv

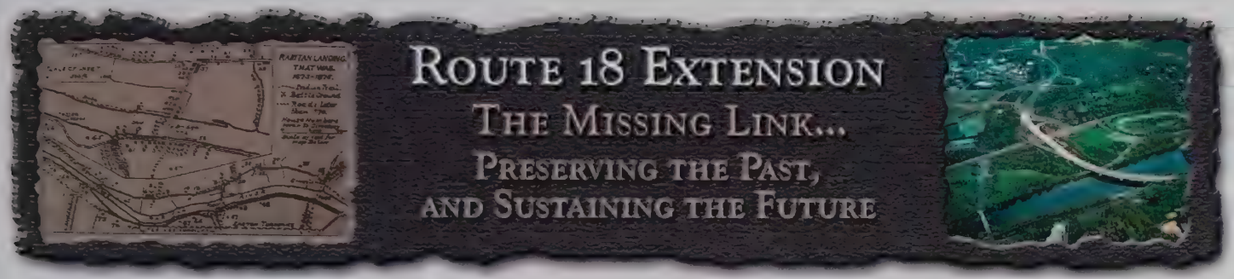


Pre-Bid Sample



-Construction Mock-Up

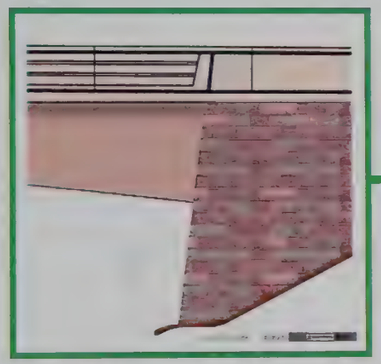
Pre-Con Finished Product



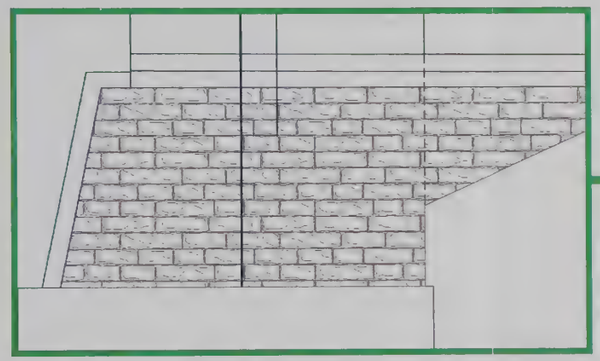
Appendix 8

Architectural Form Liners Selection Process

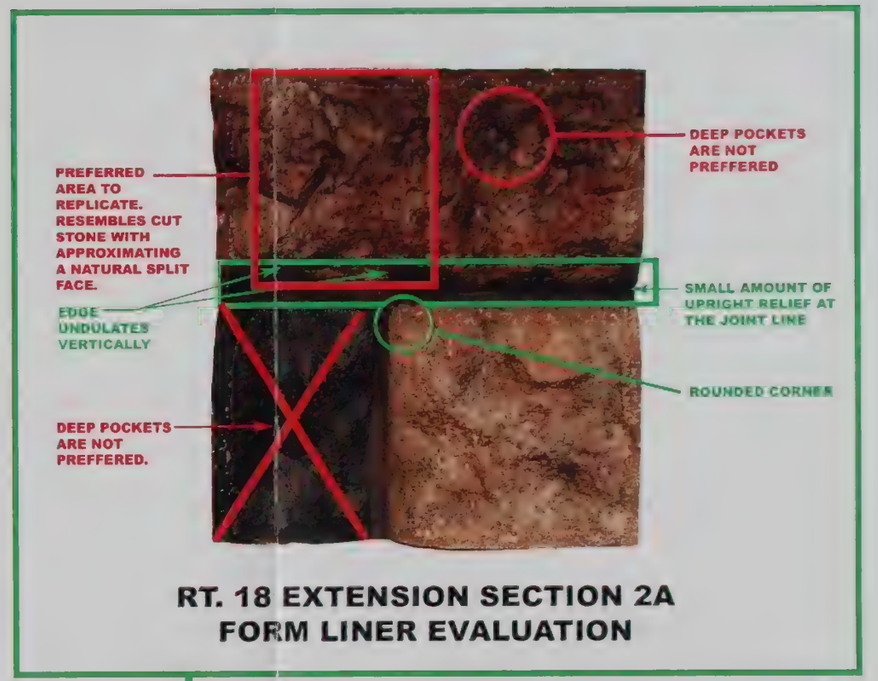
The flowchart shown depicts the comprehensive process employed by the project design and construction teams for selection and application. This well-conceived plan of close coordination and cooperation between project stakeholders resulted in a successfully completed project with significant and effective architectural embellishments.



Pre-Bid Sample



Design Drawings


PREFERRED AREA TO REPLICATE. RESEMBLES CUT STONE WITH APPROXIMATING A NATURAL SPLIT FACE.
EDGE UNDULATES VERTICALLY
DEEP POCKETS ARE NOT PREFFERED.
DEEP POCKETS ARE NOT PREFFERED
SMALL AMOUNT OF UPRIGHT RELIEF AT THE JOINT LINE
ROUNDED CORNER
RT. 18 EXTENSION SECTION 2A
FORM LINER EVALUATION

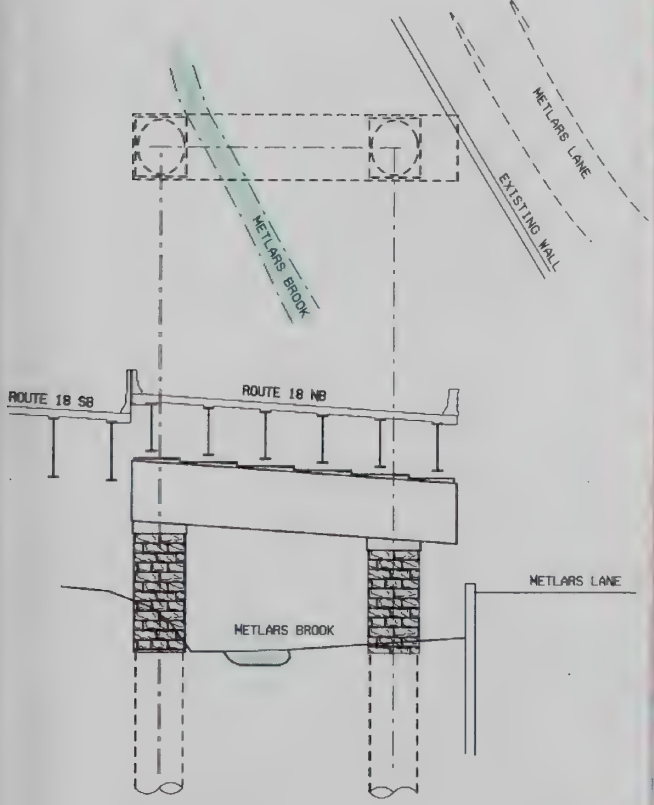
Pre-Construction Mock-Up

Pre-Construction Mock-Up

Finished Product

Route
The
Prese
and Sust

The utilization of drilled shafts in close proximity to an env
term impacts. This type of application supplements the use
dense urban areas.



Route 18 Extension

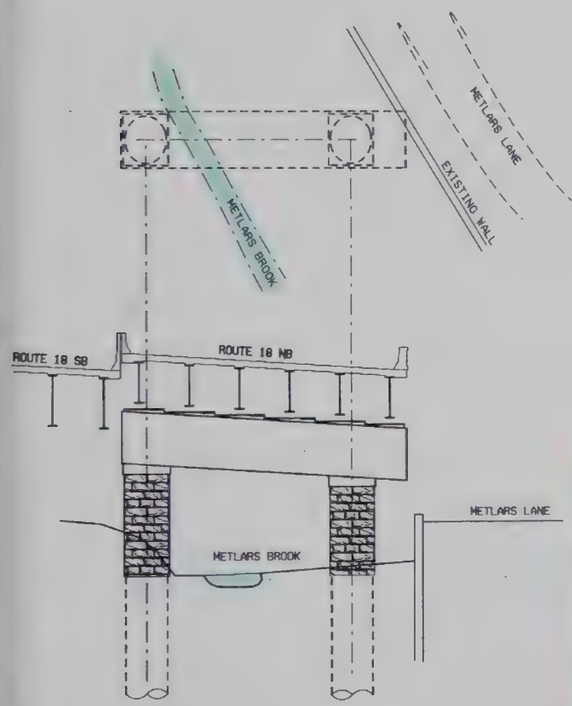
The Missing Link...

Preserving the Past, and Sustaining the Future

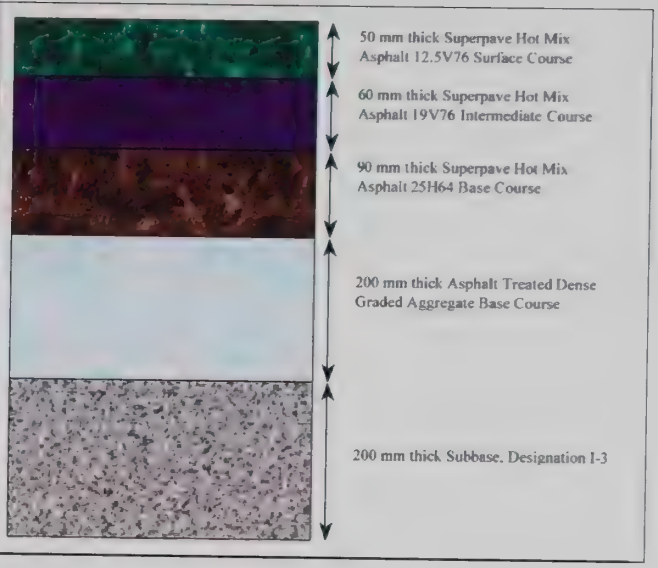
Appendix 9

Drilled Shaft with Architectural Form Liners

The utilization of drilled shafts in close proximity to an environmentally sensitive stream provided minimal short-term and long-term impacts. This type of application supplements the use of drilled shafts for the more common usage in highly constrained and dense urban areas.



Route
The N
Prese
and Sust


50 mm thick Superpave Hot Mix Asphalt 12.5V76 Surface Course
60 mm thick Superpave Hot Mix Asphalt 19V76 Intermediate Course
90 mm thick Superpave Hot Mix Asphalt 25H64 Base Course
200 mm thick Asphalt Treated Dense Graded Aggregate Base Course
200 mm thick Subbase. Designation I-3

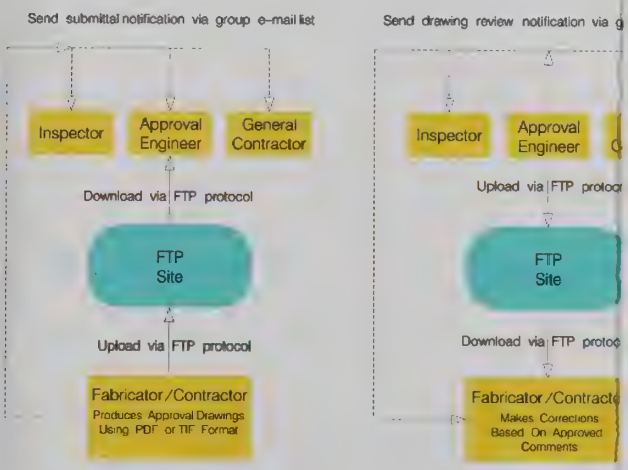
Several design techniques and innovations introduced on thi
Through collaborative meetings with manufacturers, fabrica
these design elements shown below were studied, designed,
challenges generated from the Route 18 Extension project.

Vortechnics

- Installation of Vortechnics Stormwater Treatment unit des
  enhance gravitational separation of the total suspended so
  collected in stormwater runoff
- Approximately 80 percent of the TSS will be removed an
  within a chamber located within the unit which can be pe
  removed
- Partnership between NJDOT and NJDEP to evaluate and
  select manufacturer with appropriate removal rate and mi
  maintenance cost.

Stage MSE Wall

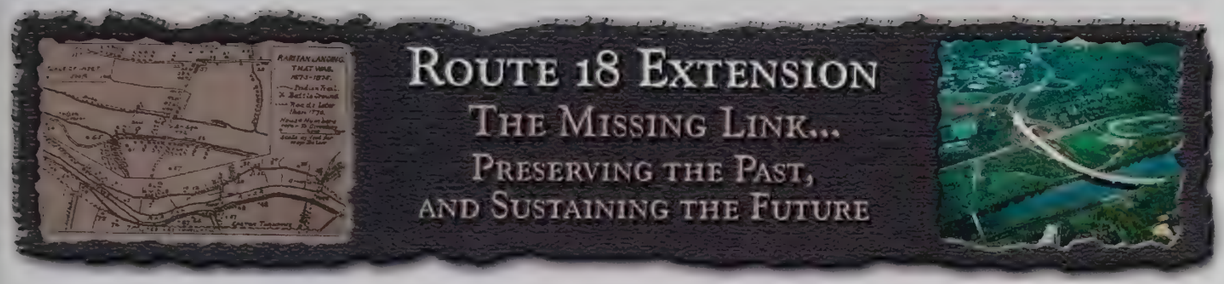
ost/easy placement
aving method to use a surcharge cell to force
tion settlement.



Electronic document flow

Electronic Document Flow

- Electronic distribution used during construction to exped
  the NJDOT
- File Transfer Protocol (FTP) site established to handle la
- Shop Drawings and Requests For Information posted in
- Speeds Project Delivery – eliminates dependency on mai



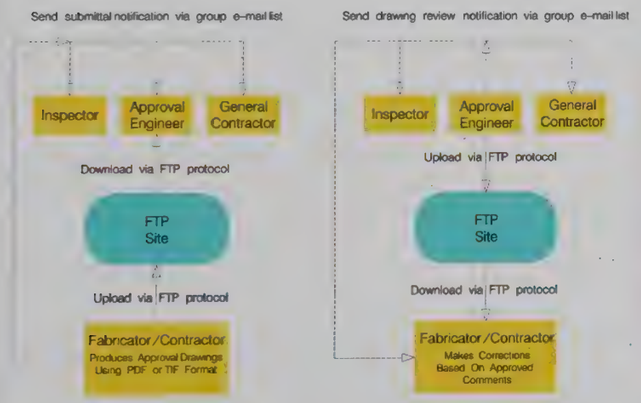
Appendix 10

Long-term Improvements

Several design techniques and innovations introduced on this project have become standard applications for future projects. Through collaborative meetings with manufacturers, fabricators, contractors, designers, regulatory agencies, and the NJDOT staff, these design elements shown below were studied, designed, and implemented as cost-effective and quality control solutions to the challenges generated from the Route 18 Extension project.

Vortechnics

- Installation of Vortechnics Stormwater Treatment unit designed to enhance gravitational separation of the total suspended solids (TSS) collected in stormwater runoff
- Approximately 80 percent of the TSS will be removed and collected within a chamber located within the unit which can be periodically removed
- Partnership between NJDOT and NJDEP to evaluate and select manufacturer with appropriate removal rate and minimum maintenance cost.



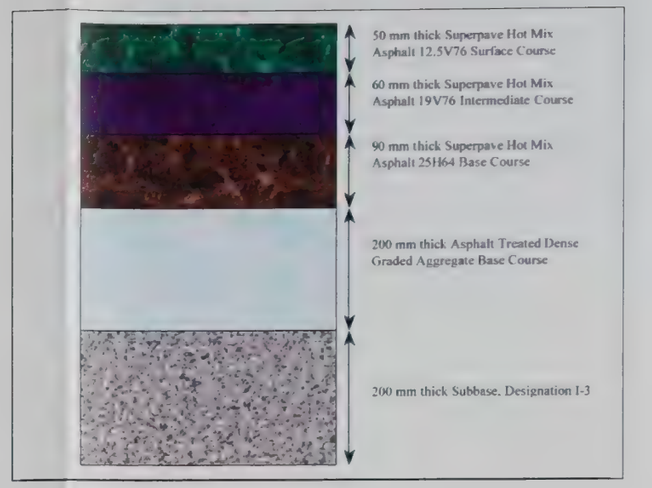
Electronic document flow

Electronic Document Flow

- Electronic distribution used during construction to expedite flow of information between fabricator, contractor, consultant, and the NJDOT
- File Transfer Protocol (FTP) site established to handle large electronic files directly without encoding/decoding data
- Shop Drawings and Requests For Information posted in real time
- Speeds Project Delivery – eliminates dependency on mail-carrier services.

Perpetual Pavement

- First Perpetual Pavement used for large-scale project - more than 27,000 megagrams
- Promotes 50-year design life
- Less maintenance over the life of the pavement
- Asphalt treated DGA maximizes strength coefficient, thereby providing cost-effective thickness.


50 mm thick Superpave Hot Mix Asphalt 12.5V76 Surface Course
60 mm thick Superpave Hot Mix Asphalt 19V76 Intermediate Course
90 mm thick Superpave Hot Mix Asphalt 25H64 Base Course
200 mm thick Asphalt Treated Dense Graded Aggregate Base Course
200 mm thick Subbase, Designation I-3

Geocomposite Slope Drain

- Lowered groundwater at the depressed roadway sections
- Ensured faster and cost-effective installation
- Provides reliable long-term flow.

Two Stage MSE Wall

- Low cost/easy placement
- Time-saving method to use a surcharge cell to force foundation settlement.

High Capacity Drilled Shaft Tests

- Osterburg Load Cell for axial load test – faster, economical, nondestructive testing
- Cross Hole Logs Testing – nondestructive integrity of the shaft testing
- Strain Gauges – determine the actual load distribution capacity of the soil and rock
- Lateral Testing – determine lateral load capacity and deflections.

FOR IMMEDIATE RELEASE

Contact: Camille Sinclair
609-530-2126
New Jersey Department of Transportation
P.O. Box 600
Trenton, NJ
www.state.nj.us/transportation/

ROUTE 18 EXTENSION WINS NATIONAL QUALITY AWARD

The Missing Link…Preserving the Past, and Sustaining the Future

Trenton, N.J. (June 2005) –The Route 18 Extension, Section 2A, Project has received the National Partnership for Highway Quality (NPHQ) 2005 National Achievement Award. This project, which was nominated by the NJDOT, was awarded for its demonstration of outstanding achievement in support of the principles of the highway quality movement. The NPHQ Achievement Award considers quality process, customer focus, teamwork, innovation and value, and long-term improvement in choosing a winner. The project team included the engineering firm of Gannett Fleming, Inc., of South Plainfield, N.J., and the contractor Slattery Skanska of New York, N.Y.

The Route 18 Extension provides a much-needed transportation solution. It eliminated a severe congestion bottleneck and completes the "missing link" in the New Jersey State highway system in Piscataway Township, Middlesex County, N.J. Underlying this location is the 18th century port community of Raritan Landing. Before construction could begin on the "missing link," a $5.8 million data recovery project to preserve the Raritan Landing Archaeological District was conducted. This constitutes the largest single archaeological data recovery undertaking sponsored by the NJDOT.

Few projects are as multi-faceted as was the Route 18 Extension. This project involved many competing resources, including archaeological/historical, environmental, and socioeconomic. Significant strides were taken to adopt avoidance alternatives to mitigate impacts to all resources. By utilizing an extensive communication network, and engaging the local public in every aspect of this project, the project team was able to build tremendous consensus among these resources, and deliver a project in which everyone can take pride.

Numerous innovative techniques were utilized on the "missing link," allowing the facility to be opened to traffic ahead of schedule and within budget. Context-sensitive solutions were also incorporated, which include numerous architectural and aesthetic enhancements that build off of the rich historic heritage of the Raritan Landing. Stained architectural concrete detailing on all surfaces of bridge abutments, walls, and piers, along with elements like haunch girders and decorative lighting, enabled the "missing link" to be seamlessly integrated into the surrounding landscape. Two miles of multi-use paths with historic interpretive signing today are enhancing residents' quality of life.

# # #

NJDOT RESEARCH LIBRARY

RY

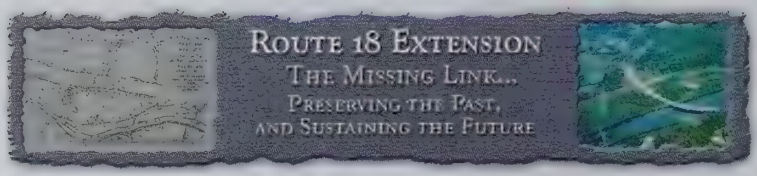
MUSEUM QUALITY
vue-all®
ARCHIVAL
Photo•Saver
#60230 • Made in U.S.A.

DATE _____ NO. _____

TITLE _____

©J.M.S. Co. Inc.
VISUAL COMMUNICATIONS
(609) 859-8400

Gannett Fleming
RT. 18
JO # 050161
View: r1_6

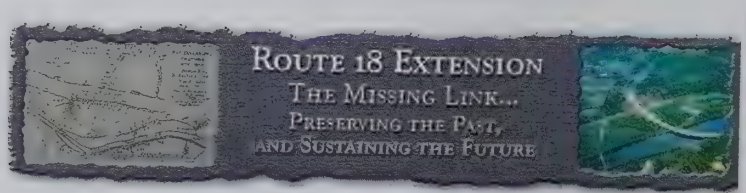


2005 NPHQ Achievement Award

Completion of the Route 18 Extension "Missing Link" significantly improved traffic conditions for both the State University and the regional traffic networks. The project was the culmination of years of planning and community consensus-building through a highly sensitive environmental area.

©J.M.S. Co. Inc.
VISUAL COMMUNICATIONS
(609) 859-8400

Gannett Fleming
RT. 18
JO # 050161
View: 535



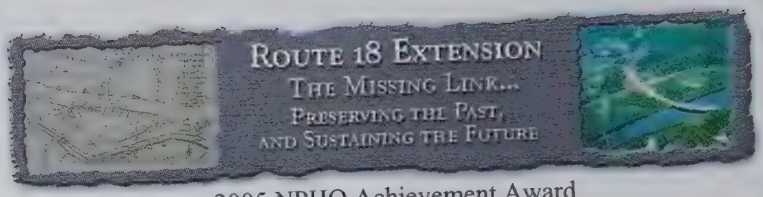
2005 NPHQ Achievement Award

Advanced archaeological data recovery uncovered remains of colonial Raritan Landing. Early partnership with many stakeholders was the key to the project's success. Historical Lowe House sits on a hill adjacent to the project.

DATE
NO.
TITLE
Photo•Saver
#60230 • Made in U.S.A.
MUSEUM QUALITY
VUE-ALL

©J.M.S. Co., Inc.
VISUAL COMMUNICATIONS
(609) 859-8400

Gannett Fleming
RT. 18
JO # 050161
View: 205

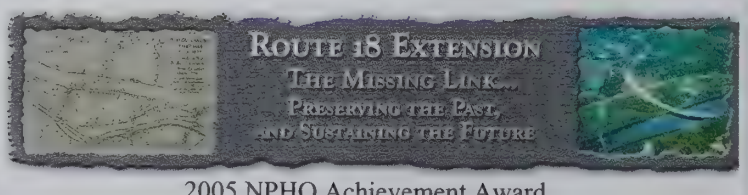


2005 NPHQ Achievement Award

An overhead view of five-by-five foot exploratory excavations that were established by archaeology data recovery teams. Using a proactive approach, NJDOT recovered more than one million artifacts prior to awarding the roadway construction project.

©J.M.S. Co., Inc.
VISUAL COMMUNICATIONS
(609) 859-8400

Gannett Fleming
RT. 18
JO # 050161
View: 0013



2005 NPHQ Achievement Award

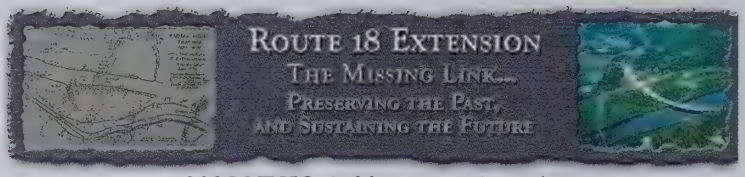
The grade separation of Route 18 and Davidson Road by way of the Davidson Road Bridge significantly reduced congestion in the area. The bridge provides a direct connection between two of Rutgers' campuses, while allowing the Route 18 traffic to flow uninterrupted.

DATE

NO.

TITLE

MUSEUM QUALITY
VUE-ALL
ARCHIVAL
Photo•Saver
#60230 • Made in U.S.A.

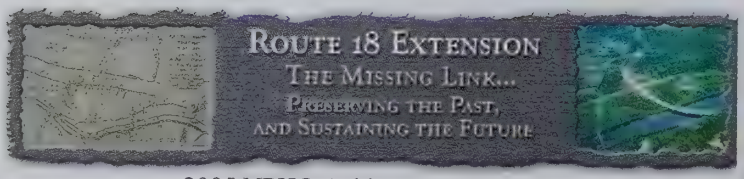


2005 NPHQ Achievement Award

Campus Road Bridge – Gateway to Rutgers' Busch Campus. Architectural quality was the key component for the entrance to the State University. Final design was a result of the collaborative effort of NJDOT, the design consultant, and Rutgers University.

©J.M.S. Co., Inc.
VISUAL COMMUNICATIONS
(609) 859-8400

Gannett Fleming
RT. 18
JO # 050161
View: 0093



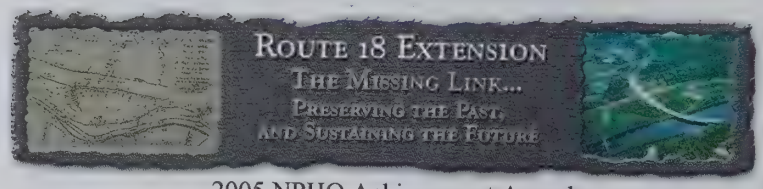
2005 NPHQ Achievement Award

The campus round-about significantly improved traffic circulation within the campus, as well as access to the local highway system. Through early partnership meetings with Rutgers, the multi-functional round-abouts were the favorite over a potential four-way stop or signalized intersection.

DATE
TITLE
NO.
MUSEUM QUALITY
VUe-all
ARCHIVAL
Photo•Saver
#60230 • Made in U.S.A.

©J.M.S. Co. Inc.
VISUAL COMMUNICATIONS
(609) 859-8400

Gannett Fleming
RT. 18
JO # 050161
View: 0043

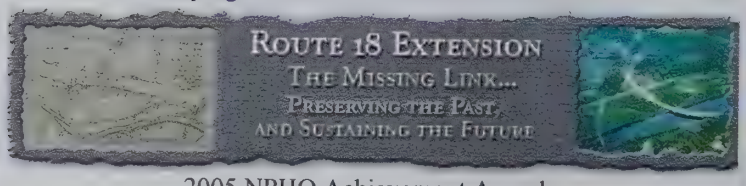


2005 NPHQ Achievement Award

The multi-use path bridge connects the city of New Brunswick and the Rutgers University Busch and Livingston Campuses. The bridge was set on continuous piers to significantly reduce wetland impacts and eliminate fill within the flood plain of the Raritan River. The architectural treatments on the piers symbolize the foundation remains of the Raritan Landing Early Colonial District.

©J.M.S. Co. Inc.
VISUAL COMMUNICATIONS
(609) 859-8400

Gannett Fleming
RT. 18
JO # 050161
View: 0103



2005 NPHQ Achievement Award

A multi-use path system was incorporated into the design, providing a bikeway network connecting Rutgers' campuses with the city of New Brunswick and Johnson Park. The path system included enhancements such as decorative lighting, cultural resource signing for Raritan Landing, an emergency telephone service, architectural walls, and landscaping.

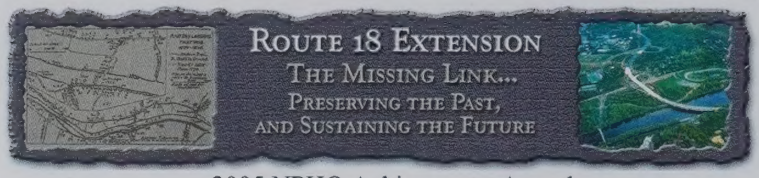
DATE NO.

TITLE

Photo•Saver

#60230 • Made in U.S.A.

VUE-ALL® MUSEUM QUALITY ARCHIVAL

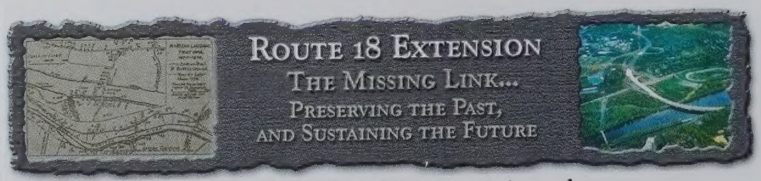


2005 NPHQ Achievement Award

Bridge piers incorporated drilled shafts to span Metlars Brook and reduce construction impacts. Innovative use of the drilled shafts and selective bridge pier configurations were used throughout the project to reduce environmental impacts.

© J.M.S. Co. Inc.
VISUAL COMMUNICATIONS
(609) 859-8400

Gannett Fleming
RT. 18
JO # 050161
View: 0006

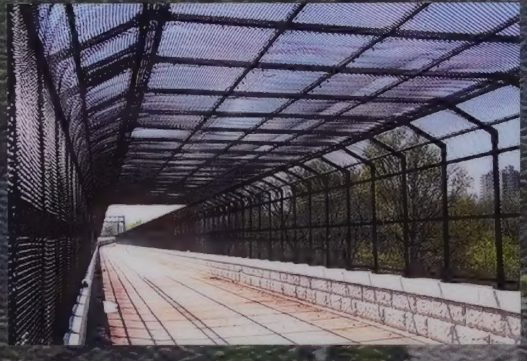


2005 NPHQ Achievement Award

The reforestation plan was the result of a group effort between NJDOT, NJDEP, the design consultant, and Rutgers University. The plan replanted 5,000 trees within the project limits, and 5,000 additional trees throughout the community.

NJDOT RESEARCH LIBRARY
3 4310 00003 7336

Route 18 Extension

The Missing Link...

Preserving the Past, and Sustaining the Future